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The Growth of Reason

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The Growth of Reason

A Study of the Rôle of Verbal Activity in the Growth of the Structure of the Human Mind

BY

FRANK LORIMER

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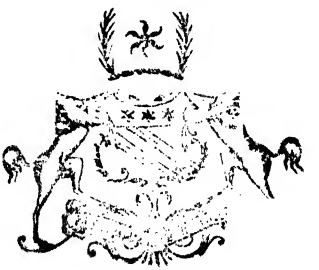
"He who considers things in their first growth and origin, whether a state or anything else, will obtain the clearest view of them."—ARISTOTLE.



LONDON

KEGAN PAUL, TRENCH, TRÜBNER & CO. LTD.

NEW YORK: HARCOURT, BRACE AND COMPANY

1929

PRINTED IN GREAT BRITAIN BY THE EDINBURGH PRESS, EDINBURGH

PREFACE

THIS study owes its principal inspiration to the work of John Dewey of the Department of Philosophy, Columbia University. It has been an especial privilege to enjoy his counsel in its preparation. In the treatment of various technical psychological problems I am indebted to Harold E. Jones (formerly of Columbia University, Director of Research, Institute of Child Welfare, University of California), Robert S. Woodworth and Gardner Murphy, of the Department of Psychology, Columbia University. I have been greatly helped in clarification of thought and presentation by my wife, Faith M. Williams. I am also indebted for valuable criticism and suggestions to Joseph Chassell, Horace English, Helen Merrell Lynd and Herbert Schneider.

F. L.

WELLESLEY COLLEGE,
January 1929.

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THE GROWTH OF REASON

INTRODUCTION

IT is an old idea that thought and language are somehow intimately related and mutually dependent. Plato in the *Theaetetus* attributes to Socrates the idea that all thinking is sub-vocal conversation: "I speak of what I scarcely understand; but the soul when thinking appears to me to be just talking—asking questions and answering them, affirming and denying. And when she arrives at a decision, either gradually or by a sudden impulse, and has at last agreed, and does not doubt, this is called her opinion. I say then that to form an opinion is to speak, and opinion is a word spoken—I mean to oneself and in silence, not aloud or to another." [1] This suggestion is employed by Plato in the development of a theory of the nature of judgment.

In contrast, the utter neglect of the relation of reason to language in Kant's *Critique of Pure Reason* constitutes one of the radical defects in that great work. The brilliant and erratic Hamann, "Kant's Alcibiades", insisted that the celebrated philosopher would have done better to have written a Critique of Speech. Later Mauthner actually attempted to carry out this project, but his achievement turned out to be decidedly amateurish. More recently, however, a Kantian scholar, Benno Erdmann, who is also a psychologist and logician of the first rank, has founded a very interesting logical theory upon the recognition of the function of language in the organization of judgment.

In fact, a review of the work of such different contem-

[1] Plato, *Theaetetus*, 190 (Jowett trs.).

porary thinkers as Decroly, Delacroix, Meumann, Stern, Freud, Jung, Jespersen, Malinowski, Ogden and Richards, Rignano, Dewey, and Grace de Laguna indicates an increasing recognition of the principle that an adequate account of the rôle of language in its interrelation with all other forms of human activity is essential to the treatment of many of the central problems of social science and philosophy. Meanwhile an American psychologist, John B. Watson, has created a considerable stir by the proposal that the term " laryngeal behaviour " be substituted for the term " thinking " in scientific discussions.

A valuable hint regarding the rôle of speech in the life of mind, which has frequently appeared in discussions of the subject, was stated concisely by Schopenhauer, thus : " All that has been considered by all nations and in all times as explicitly the work or manifestation of the Reason . . . may evidently be reduced to what is possible for abstract, discursive, reflective, mediate knowledge, conditioned by words, and not for mere intuitive, immediate, sensuous knowledge, which belongs to animals, also." [1]

Assuming this distinction, some poets and philosophers have glorified the " pure " intuitive knowledge of immediate (animal) apprehension, and regretted the corruption of mind by the introduction of symbols :

" Sure Man was born to meditate on things,
And to contemplate the eternal springs
Of God and Nature, glory, bliss, and pleasure ;
That life and love might be his Heavenly treasure ;
And therefore speechless made at first, that He
Might in himself profoundly busied be :
And not vent out, before he hath ta'en in
Those antidotes that guard his soul from sin.
Wise Nature made him deaf, too, that He might
Not be disturbed, while he doth take delight
In inward things, nor be depraved with tongues,
Nor injured by the errors and the wrongs
That mortal words convey. For sin and death
Are most infused by accursed breath,

[1] Schopenhauer, *Fourfold Root of the Principle of Sufficient Reason* (Hillebrand trs.), p. 40.

That flowing from corrupted entrails, bear
Those hidden plagues which souls may justly fear.
This, my dear friends, this was my blessed case;
For nothing spoke to me but the fair face
Of Heaven and Earth, before myself could speak,
I then my Bliss did, when my silence, break." [1]

And here is Berkeley:

" We have, I think, shown the impossibility of Abstract Ideas. We have considered what has been said for them by their ablest patrons; and endeavoured to show they are of no use for those ends to which they are thought necessary. And lastly, we have traced them to the source from whence they flow, which appears evidently to be language.—It cannot be denied that words are of excellent use, in that by their means all that stock of knowledge which has been purchased by the joint labours of inquisitive men in all ages and nations may be drawn into the view and made the possession of one single person. But most parts of knowledge have been so strangely perplexed and darkened by the abuse of words, and general ways of speech wherein they are delivered, that it may almost be made a question whether language has contributed more to the hindrance or advancement of the sciences. Since therefore words are so apt to impose on the understanding, I am resolved in my inquiries to make as little use of them as possibly I can: whatever ideas I consider, I shall endeavour to take them bare and naked into my view, keeping out of my thoughts, so far as I am able, those names which long and constant use hath so strictly united with them."

" Whoever therefore designs to read the following sheets, I entreat him that he would make my words the occasion of his own thinking, and endeavour to attain the same train of thoughts in reading that I had in writing them. By this means it will be easy for him to discover the truth or falsity of what I say. He will be out of all danger of being deceived by my words, and I do not see how he can be led into an error by considering his own naked, undisguised ideas." [2]

Generally, however, the discussion of the relation of mind and language has proceeded in terms of a dilemma between two contradictory theses, something as follows: *Thesis One:* Mind is a unique kind of substance, having

[1] Traherne, " Dumbness," *Oxford Book of English Mystical Verse*, p. 68.

[2] Berkeley, *The Principles of Human Knowledge* (1710 Edition). Introduction, paragraphs 21 and 25.

its own peculiar structure (the " forms of rational experience ", the " structure of consciousness "), considered to be discontinuous with the structure of (other) natural processes; and the relation of words to ideas is simply that words are a common vehicle of the expression of ideas. *Thesis Two:* Thinking is a type of behaviour which is fundamentally linguistic in its organization, and the whole structure of mental life can be discovered in the social organization of the processes of words, gestures or other symbols; to have ideas is to form words, aloud or silently.

It is here maintained that this dilemma is rooted in an ignorance of the actual processes of animal behaviour and the acquisition of speech in infants; and that more satisfactory solutions of problems centering about the development of the structure of mental life may be attained through more thorough and careful empirical investigation of its actual conditions and processes—and especially through a study of the changes in behaviour involved in growth of verbal activity in children. Recent advances in physiology, anthropology, linguistics, comparative and child psychology make possible a more adequate statement of this subject to-day than could possibly have been given twenty or even ten years ago.

The positions developed in the following pages were not, for the most part, in the author's mind when he undertook the study, but have emerged from the handling of the material itself. The central thesis may be stated as follows: The processes and organization of communication are continuous with other physiological and social processes, and the evolving structure of intellectual activity (including the *forms* discovered by logical analysis) is a function of the total growth of life prior to and including the growth of verbal activity; the structure and processes of intellectual activity, at all stages, are capable of systematic investigation and genetic interpretation.

After an empirical investigation and formulation of the growth of mental life, and especially of the organization

of symbolic activity, an attempt will be made to interpret the significance of these findings for general philosophy, logic, social theory and education.

Inasmuch as all interpretative studies are necessarily conditioned by the metaphysical attitudes of the author, it is but fair to the reader that I should state as candidly as possible the particular prejudices which seem to me to be most reasonable and satisfactory in undertaking this investigation. One hears a great deal to-day about the importance of " controlled experiment " in the biological and social sciences—as though all experiment did not involve an element of control, which varies in degree but is never wholly absent or absolutely perfect. It is especially important to *emphasize* controlled experiment in these sciences because of the distinction between the " organic events " treated in such investigations and the " inorganic events " treated in the so-called physical sciences. The former may be simply defined as events which constantly enforce a recognition of their context in " an order and unity maintaining itself in the midst of a changing environment ". The latter, the so-called inorganic events, are those which can be easily treated, for most practical purposes, without regard to their total context. However, it is important to remember that the distinction between the organic and the inorganic is at bottom a matter of practical convenience. Obviously it is important and significant; but there is no reason to assume that it points to any absolute division or radical discontinuity in nature. There is no reason, on the one hand, to assume that organisms act in accordance with any principles which are discontinuous with the principles applicable in the explanation of other types of reality. And there is no reason, on the other hand, to assume that any natural event can be " completely explained " apart from its total cosmic context. The abstraction of a mechanical nature may appeal to the " tough-minded " as more heroic than the conception of an independent soul, but it can hardly be credited with greater logical consist-

ency. Nor is there any need for the purposes of efficient science to treat guiding principles, such as "the conservation of energy" or "the uniformity of nature", as absolute metaphysical dogmas. The botanist who would assert that he could account for every intra-atomic change, every possible relationship to a cosmic consciousness, every "what-not" in the growth of the "flower in the crannied wall" would be a rash metaphysician. The conception of an absolutely complete explanation is analogous, in the realm of philosophy, to the conception of a self-regulating perpetual-motion machine, in the realm of mechanics.

Living things are distinguished from so-called inorganic things by the intricacy and importance of recognizable organismic relationships. The term *mind* points to that most immediate context in which thoughts originate. It is assumed to be continuous with the more remote context signified by such a term as *nature*. For this reason, it is especially obvious that no "complete account" of mind, as such, can ever be rendered. It is the immediate whole within which special problems must be conceived and elaborated. This is, however, simply a more obvious case of the limitation which attends all science and all philosophy, and the same perserverance and technical accuracy which have been fruitful in other fields of research may be relied upon to illuminate the relationships of various factors in fertility of imagination and accuracy of logical construction.

I entertain no illusion that the scientific study of the development of symbolic activity will prove a panacea for bad philosophy, or that all my own philosophical depravity has been purged by this undertaking. Nevertheless, I find that most philosophical problems of any considerable moment (especially in the field of logical theory) and many special scientific and social problems have for me, at least, been greatly clarified by this study. New insights into problems at first apparently quite remote have been constantly suggested to me by the materials I have sought to interpret.

CHAPTER I

THE GROWTH OF INTELLIGENCE PRIOR TO VERBAL ACTIVITY

I. WORDS like *thought* and *intelligence* are commonly applied to complex phases of life which have been gradually marked off and vaguely apprehended in the course of human culture. More careful study reveals component processes which are variously combined in the complex and shifting phenomena to which such traditional terms are applied. In particular, the distinction between organic intelligence and symbolic processes is of supreme importance in understanding human intellectual activity. There are a group of processes, relatively independent in their structure of any social factors, in which the control of life is centred in all dumb animals; they may be called the processes of *organic correlation*, or organic intelligence. These processes also underlie human rational intelligence. On the other hand, the structure of human reason is formed, for the most part, of *symbolic processes*[1] (verbal, gestural, etc.) and types of conceptual activity which are dependent in their essential organization upon symbolic processes. And, in turn, these symbolic processes are in large part dependent upon and determined by social processes and organization. The following chapters will deal with the origin of symbolic processes, the causal factors which determine their growth, and the effects of their operation in the reorganization of organic intelligence and in building up the structure of human minds.

The present chapter is concerned with a preliminary sketch of the growth of organic intelligence prior to the

[1] The term "symbol" is used variously by different writers. The problem of its use and definition will be discussed in a subsequent chapter.

operation, to any considerable extent, of symbolic activity or any other specific processes which are fundamentally social in origin. The purpose here is to secure a preliminary appreciation of the fundamental principles of intellectual life and an adequate background for dealing with the function of words in the evolution of mind. Organic intelligence, even apart from and prior to symbolic processes, is inconceivably complex. Nevertheless, distinct factors and stages of development may be discerned through genetic study and systematic analysis.

II. It seems possible to differentiate three fairly definite stages in the evolution of organic intelligence, prior to the rise of "free intelligence" which is dependent upon verbal activity (or analogous processes). These three stages may be labelled as follows: (1) *the organismic correlation of excitation-transmission processes,* (2) *the development of nervous system as the specialized apparatus of excitation-transmission and correlation, and* (3) *the differentiation of intentions and distinct perceptual patterns within the processes of neural correlation.* These divisions are made from a functional standpoint and are, of course, highly schematic. The detailed study of various types of physiological structure would yield a more detailed and somewhat different scale, but would be less serviceable for the purpose in hand.

III. In approaching the study of the foundations of intellectual activity it is necessary to frame a working formula of the nature of an organism. *An organism is a tensional dynamic system, determined by the interaction of innate and environmental factors, and maintaining a more or less constant pattern in the midst of incessant changes, within and without.*[1] This statement is given here as a

[1] The fundamental terms in this formulation may be further defined something as follows: *Tension* is the "implicit" interaction of any specific process with other processes or with its total context or field—where the term *implicit* is understood to mean a relationship below the level of least measured or explicitly stated factors, such as "causes" and "effects" in physical studies and symbolized "distinct ideas" in

hypothetical working formula, and it would be impossible to attempt to demonstrate its validity here except in so far as its usefulness in making possible a consistent account of the growth of intellectual activity in itself constitutes such a validation. It is, however, in line with the formulation of organic processes by Child and others who are engaged in the experimental investigation of protoplasm and the behaviour of protozoa.

Child has also introduced a conception of " gradient ", which is closely related to the formula just stated. A *physiological gradient* is a pattern which appears in relatively homogeneous tissue where some vital process is developing with various degrees of intensity, or levels of acceleration or retardation. It is most apparent in the spread of an excitation through a more or less homogeneous but resistent medium. Such an excitation-transmission in protoplasm follows a sort of highway which shades off on either side and gradually terminates in a region where it either appears to be lost or may be recognized as eventuating in specific movements or other changes. When the changes which are eventually effected by an excitation remove the cause of the excitation or allay its disturbing influences in the organism, the changes are said to constitute an " adaptation ", or restoration of equilibrium.

Any little amœba, if pricked with a pin, will obligingly demonstrate the character of an excitation-transmission gradient, the tension of organismic correlation, and the principle of restoration of organic equilibrium. The spread of the excitation will develop a definite pattern

introspective analysis. (Thus the advance of experimental technique and conceptual analysis constantly marks off specific factors and explicit relations within previously implicit phases of reality.)

A situation in which implicit factors are undergoing rapid reorganization is said to be in a state of *dynamic tension*, in contrast to a *static equilibrium* where the conditioning factors are all relatively constant. A *dynamic equilibrium*, or *tensional dynamic system*, is therefore definable as a state characterized by the constancy of certain factors which preserve the " pattern " or " system " in adaptation to other factors, without and within, which are rapidly changing.

with decrements of intensity at various points in proportion to their distance from the focal point of excitation and the axis of transmission; and the protuberances which draw the animal away, the "pseudopodia", will appear at the surface opposite to the origin of the irritation. This behaviour, however, will be more or less modified by the line of procedure which the amœba is following at the moment of the new application and the immediately preceding experience. The reaction thus follows a definite pattern determined by the constitution of the animal but is nevertheless sensitive to any changes at any point in the total organism. Moreover, the reaction described may properly be called an adaptation; it tends to restore organic equilibrium and preserve the integrity of the whole dynamic system.[1]

IV. The *first stage* of intellectual activity may now be defined as *the tensional organismic correlation of vital processes and adaptability, the capacity to restore equilibrium in relation to quite a wide range of environmental changes.* It may seem rather forced at first to describe an amœba's reaction to a pin-prick as being intellectual. But, in the first place, it is important to emphasize the contrast between the behaviour of an amœba and the behaviour of a piece of putty under the same circumstances. The putty lacks adaptability. It would simply sit still and be picked to pieces; likewise it would fail to distinguish between substances in its neighbourhood, being unable to incorporate some and reject others. In the second place, there is a very clear continuity (which the succeeding paragraphs will attempt to trace) between the tensional adaptation of the amœba when disturbed and the operations of Aristotle, for instance, in attempting to reconcile absolute substances and the processes of logical demonstration, as recorded in the *Metaphysics*.

Thorndike has expressed considerable interest in

[1] See, for the further description, Child, *The Physiological Foundations of Behavior*, pp. 24, 217-8.

attempting to fix a norm for zero intelligence, so that a scale may be constructed with regular intervals between this zero point and the characteristics of Aristotle and his modern compeers. " Knowledge of the location of zero intellectual difficulty not only will put all our measures of difficulty, or altitude of intellect, into numbers capable of treatment in ratios, but also will put all our measures of what may be called the total ' surface ' or ' area ' of intellect, into numbers capable of similar treatment." A minimum test suggested by Thorndike is, " Will not try to bite off his own toes", and it is proposed that other ingenious tasks might be devised which would be better adapted for use with earthworms. " The difficulty of the intellectual task which the earthworm's intellect can master is so near zero difficulty that a level slightly below it may safely be accepted as an approximate absolute zero of intellectual difficulty." [1] However, trying to bite off one's toes seems to be a great deal cleverer than not knowing how to bite at all; and perhaps Thorndike is doing an injustice to the earthworm. I should nominate the performances of the putty—and yet perhaps if I understood its structure better and the history of its molecules I might treat even the putty with more intellectual respect.

The term *adaptation* has two quite different uses in biology, and a good deal of confusion may be avoided by distinguishing these two uses carefully. Firstly, there is the establishment of a new equilibrium in an individual organism in relation to some condition which is itself an operating factor in initiating the changes involved in the adjustment. Secondly, there are changes in the hereditary structure of organisms which may be caused by the operation of " chance " factors in the development of the germ plasm and which may be eventually " selected " as having survival value for the species. The latter sort of " adaptations ", of course, play an important rôle in organic evolution, but the former sort are central in determining the activity and the developing structure of individuals.

[1] Thorndike, *Measurement of Intelligence*, pp. 339-42.

Individual organismic adaptation in relation to actual conditions which tend to disturb organic equilibrium is the fundamental principle of *habit formation*. Its operation is well illustrated in the phenomena of "acclimatization" in simple plants and animals. Individual adaptations may, of course, be hereditary in the case of simple organisms which have no differentiated germ plasm, and so accumulative effects may be watched over several generations. Rignano applies the term "mnemonic accumulations" to all organismic adaptations which condition the re-enactment of definite response patterns upon repetition of the appropriate environmental factors. But true memory involves two further distinct factors (as will appear in the sequel). Therefore, it seems unwarranted to invoke Mneme at this stage of the plot. However, the relation of the phenomena of acclimatization to the processes which underlie all habit formation is excellently set forth in the following brief descriptions taken from Rignano:

Infusoria may become accustomed to a constantly rising temperature which would be fatal to another individual not so acclimatized. "It is likewise known that the same species of protozoa are found in both fresh water and salt water, and that it is possible to accustom fresh water amœbæ to a salinity which would have destroyed them at the start—and many other instances could be cited. . . . The diatom Navicula brevis ordinarily avoids even the weakest light and tends to retire into the darkest part of the water in which it is being observed. However, if a culture is placed in the bright light of a window for two weeks, it exhibits the opposite tendency and makes for the brightest part of the drop as soon as this is carried back again to its former condition of weaker illumination. . . . The new physiological state arising from adaptation to a new environment, when once it has supervened and has lasted for a certain time in the organism, tends to renew itself. This tendency of a past physiological state to 'reactivation' or reproduction is merely the tendency inherent in every mnemonic accumulation to evoke itself again." [1]

All organic activity appears as a *reaction* (which may be more or less localized in some region but tends to

[1] Rignano, Eugenio, *The Psychology of Reasoning*, p. 8 f.

involve the whole organism) to some specific factor, called the *stimulus*. Each restoration of organic equilibrium involves the total organism in various gradients of tension. Such new equilibrium-conditions may then become established in the permanent organic structure conditioning fixed types of reaction to types of stimulation, or irritation. Thus " organismic tension " and " habit formation " may be regarded as complementary conceptions, and all habits may be regarded as " intellectual " (in the organismic sense) in their origination.

Hereditary structural adaptations (in the second, and more general sense of the word adaptation), in turn, whether originating as organismic adaptations to the environmental conditions in which they have survival value (as may be the case with protozoa) or whether originating in " chance variations ", constitute the hereditary basis of the distinct types of animal behaviour. The gradual elaboration of more and more highly differentiated functions and organs is what is sometimes called " progress " in evolution, because it supplies the basis for greater and greater adaptability to varied environmental conditions. The more general kind of intrinsic behaviour pattern (conditioned by innate factors) is commonly called an *instinct*, and the more limited kind in which the action is fairly circumscribed in some region is called a *reflex*. Thus instincts are more frequently characterized by widespread visceral changes and emotional quality than reflexes, and merge indistinguishably into the most plastic types of tentative response which are acutely sensitive to the influence of other processes in organismic correlation. The terms instinct and reflex, however, are both properly confined to the more intricate sort of behaviour patterns which involve specialized neural organization, and, therefore, really belong to the next stage of organic life.

V. As we pass to the consideration of what has been labelled the *second stage* in the evolution of animal intelligence, we find more definite materials at our disposal and

are able to trace more exactly the relation of various intellectual functions to specific physiological structures. It is most important to recognize neurological structures as originating in, and continually functioning in integral relation with, the total organismic system. The tendency to isolate the treatment of neurological behaviour from other types of behaviour has been a cause of very serious misconceptions of intellectual functions. Nervous tissue is primarily a tissue especially adapted to the effectual transmission of excitation (probably involving both chemical and electrical modes of transmission), and, therefore, may be conceived as originating as an excitation-transmission gradient with dominance over other physiological processes. Then the organization of various strands of nervous tissue provides for the centralized correlation of such excitation-transmission processes. Thus the basis is provided for *the intricate processes of neural correlation of excitation-patterns with mutual reinforcement between certain patterns and mutual inhibition between others.* This is the supreme principle of neural intelligence.

Mutual reinforcement, or facilitation, and mutual retardation, or inhibition, of organic processes is not by any means limited to neural processes. Any excitation process which passes through an organism affects the tissue through which it passes intensely at the time and may leave after effects. It is fairly obvious that such processes must tend to facilitate certain other simultaneous or immediately subsequent processes in the same or contiguous tissue and to interfere with and perhaps wholly prevent other possible processes. But with the evolution of nervous system more definite types of reaction pattern, utilizing various nerve fibres, are established. Facilitation and inhibition, in so far as the various nerve fibres are connected and capable of interaction, therefore becomes much more complex and exact. Moreover, the " all-or-none " principle of nerve action (the experimentally established principle that nerve action if evoked at all operates with full force in each instance and without apparent decrement in the passage)

introduces a new complication. In accordance with this principle one stimulus which in itself may be too weak to set off some particular final response may be reinforced by other overlapping excitations so as to call out the response in question. On the other hand, a stimulus which in itself might be strong enough to evoke some particular response may be neutralized by other disturbing or antagonistic processes. The " synthesis " of neural processes is the central feature of " conditioned reactions ", " learning ", " insight " and all types of new positive adaptation and habit formation, involving neural activity. And similarly the interference or conflict between various types of neural response is the basis of " neural analysis ".

A " nerve net " is an elementary type of nervous system such as is found in the medusa, more familiarly known as jelly-fish. The presence of such a nerve net, according to Herrick, " introduces the following improvements in the neuromuscular apparatus: (1) The excitation has a greater range of application; and total responses to stimulation and integration of larger and more complex bodies are possible; (2) reinforcement and (3) inhibition of response are facilitated." [1] But the nerve net is at best a rather indifferent conductor as compared with the nerves of higher animals. The growth of more and more intricate neural structure makes possible more effective analyses and syntheses of behaviour patterns. More intricate correlation is provided, and various definite relationships of reinforcement and inhibition between specific neural patterns are established. And this neural correlation is ever integral with the total organismic correlation whereof the nervous system is simply a specialized mechanism. " The nervous system is the chief apparatus of excitation, conduction and integration by which environmental forces operating on the body are transmitted to the particular organs whose activity produces the appropriate reaction. Some of these neuromotor connections may be so made as to produce tropisms . . . but many

[1] Herrick, *Neurological Foundations of Animal Behavior*, p. 92.

of them are undoubtedly more complex than this, with variable types of interaction, in the centres of adjustment, of numerous simultaneous or successive excitations leading to one of several possible responses depending on the internal physiological condition of the reacting mechanism at the time. The identical stimulus applied to an earthworm may at one time be followed by a forward crawling and at another time by an avoiding reaction in the form of a quick jerk which brings into play an entirely different set of nervous elements, the difference in response depending on the physiological state of the worm at the time. This conception of the analysis in the correlation centres of an excitation-conduction complex so that the discharge may eventuate in diverse ways at different times on account of varying internal states is by no means a vague generalization or a meaningless play upon words, for many of the factors involved have been definitely analysed and quantitatively expressed in terms of physiological gradients, bio-electric charges, accumulation of toxic products of metabolism in fatigue, and more important still "competing conduction paths".[1]

A donkey who stands between two bales of hay has an intricate neural apparatus for determining which bale by its size, fragrance and other delectable qualities has the greatest command upon his attention. He is not dependent, as an amœba would be, upon the crude resolution of attractions within his whole frame. Therefore, he is able to make the decision more swiftly and more accurately, or in other words, to behave more intelligently.

But this excellent intellectual apparatus is not isolated from the other physiological processes of the donkey. The fallacy in the scholastic conception of the ass who starves because he is unable to decide between two equally distant bales of hay lies in the fact that the pulsing of the heart or a twitch of the skin of any real donkey would immediately upset any such absolute equilibrium. Moreover, there is clear evidence that the nervous processes

[1] Herrick, *op. cit.*, p. 99.

themselves function in rhythmic phases, so that alternations of attention are a fundamental feature of experience. "The object of attention constantly fluctuates." Some years ago in the Vassar laboratory an attempt was made to investigate experimentally a phenomenon that nearly every one has noticed: the fact that if you look steadily for some time at a printed or written word it takes on a strange and unfamiliar appearance. "As our observers gazed steadily at a single printed word for three minutes," Washburn reports, "they noted that the word was constantly changing; constantly new pronunciations, new syllable divisions, and so on. 'Acre' would become 'ac-er', 'a-cree', and so on. This shifting of the object of attention has been referred to the fact that primitively a stimulus must be a change in the environment of an organism, and that an unchanging object cannot be a stimulus. But in fluctuations of attention it is not really the stimulus, not the external object, that changes. What changes is our reaction to it, and the reason for this constant change of response to a stimulus in attention is that the essence of attention is movement, and that the great majority of motor processes are of the phasic rather than the static or attitude type." [1]

Other than purely neurological processes are, in fact, usually the decisive factors in any sustained tensional situation. The irradiations of excitation involve complicated accessory and inhibitory reactions throughout the whole organism. The heart-beat may be quickened or slackened. Glandular activities may provide various types of excitation or depression. Muscular tonus is altered in different parts of the body with various kinesthetic effects.

Apparently, also, it is in such situations, involving the total organism in tensional relation to various potential activities, that the phenomena of *consciousness* appear.[2]

[1] Washburn, *Movement and Mental Imagery*, pp. 35-6.

[2] *Ibid.*, also Herrick, *op. cit.*, and others.

On the ultimate relations involved in conscious behaviour only a hasty metaphysician would venture to dogmatize. The fact of its apparent relation to situations of heightened organic tension is, however, in itself a fact of profound interest. The presentation here developed is in line with the thesis formulated by Washburn regarding the nature of mental imagery: "Upon the occurrence of tentative movements and their combination into simultaneous and successive movement systems will be based the whole theory (developed in *Movement and Mental Imagery*) of the nervous processes underlying the inner life of the mind." [1]

Reaction systems may be initiated and sustained by specific types of internal excitation, such as the stimulation arising from the rhythmic contraction of an empty stomach. Such sustained internal stimulation may be reinforced by excitation of the so-called *distance-receptors*, eyes, ears, nose and so forth (as when a hungry animal sees, hears or smells distant prey). The reaction systems related to a specific excitation are the habits which have been established in relation to the restoration of organic equilibrium and the cessation of the excitation. But it is easy to see that reaction systems may often be initiated in situations in which they cannot be completed. The elements in total reaction systems which allay the related excitation are described as *consummatory reactions*. The elements in such reaction systems, on the other hand, which do not of themselves tend to restore organic equilibrium, but are merely accessory to other elements that are consummatory, and so indirectly contribute to the consummation of the situation are described as *preparatory reactions*. Thus the eating of food might be described as a consummatory reaction in relation to hunger, whereas such food-getting reactions as hunting and the stalking of prey would be called preparatory reactions.

It is important to recognize that the processes in which the correlation of reaction systems are focused in the

[1] Washburn, *op. cit.*, p. 58.

higher forms of animal life, are *minute* and relatively obscure processes. They are capable only of partial introspective report, of little direct instrumental experimentation, and are primarily affairs of inferential discovery (like the atoms of the physicists). This distinction between *minute* and *implicit* processes on the one hand, and *gross* and *overt* processes on the other hand, is of great importance. It is not only a distinction of great convenience in biological science but it also has great historic significance. The minute and obscure biological processes, at first only discovered introspectively as private events, have exercised a peculiar rôle in philosophical theory. They have been conceived as a realm discontinuous from the realm of observable things. Much speculation has, therefore, arisen as to which set of processes, the implicit "spiritual" or the overt "material", were to be conceived as ultimately derivative from the other set; or, the processes being conceived as equally "real" but essentially discontinuous, the speculation has concerned itself with the problem as to how they ever got into mutual relation. The emancipation of the human mind from this dilemma may fairly be said to be the greatest achievement of modern philosophy.

Intellectual activity is *focused* in these minute processes of neurological correlation. Here inconceivably intricate processes, involved in all degrees of mutual interrelation from absolute integration to absolute antagonism, constantly tensional, sensitively accumulative, respond on the one hand, as reaction processes, to the excitations of external stimulation and primary behaviour patterns, and on the other hand, as themselves stimuli, control other minute processes and overt behaviour patterns.

The implicit responses of intellectual activity are related to some overt features of the situation, *as reaction* to stimulus, that is, as effect to cause, and the same implicit responses are related to other overt features of the situation *as stimulus* to specific adjustments, that is, as cause to effect. This *two-way* organic relationship between

certain implicit processes (ideas) and overt events (things) supplies a fundamental principle for the adequate interpretation of problems of *meaning*. Ideas as implicit processes are in the first place *representative* of things; in the second place, they are *instrumental* to new adjustments, activities and the rearrangements of things.

But these relationships of implicit-reaction-to-overt-stimulus and implicit-stimulus-to-overt-reaction are in themselves intricate organic processes, and even when added together, they cannot be regarded as exhausting the organic relations of the implicit processes of thought. Rather these processes must be recognized as involved in a continuum of intricate interrelationships within which the two types of relationship described above constitute the two major types or limiting cases. A cross section of intelligent behaviour involves an interrelation of various excitation-transmission processes which range from *neutrality* to *reinforcement*, on the one hand, and to *inhibition*, on the other.

VI. The *third stage* of major importance in the evolution of animal intelligence, according to the outline suggested above, is the differentiation of *distinct patterns, as functional units, within the implicit processes of intellectual experiment.* Two features of this development call for special attention: (1) the differentiation of *intentional patterns*, and (2) the organization of *distinct perceptual patterns* which constitute the elementary physiological foundation of memory.

In situations of sustained tension, such as are typified by the condition of a hungry animal who sees food that he cannot reach, some of the minute processes of specialized correlation may be *sustained in excitation* and function as *foci of the irradiation of excitation.* Such patterns become the dominant factors in the reinforcement or inhibition of various tentative reaction systems. Sustained excitation patterns within the implicit processes of thought in any problem situation may be called *intentions.*[1] In such situations the repetition of preparatory reactions whose

[1] The term *purpose* is reserved for a *symbolized* intention.

consummatory reactions are blocked tends to be inhibited, and new preparatory reactions are continually initiated. Inasmuch as the intention dominates the excitations, tentative reaction systems (" suggestions ") which are accessory to the intention are facilitated and those which are unrelated or antagonistic are neglected or inhibited. Thus the intention acts as a selective agent in the control of reactions in highly tensional situations. The implicit solution of problem situations is called *intellectual trial and error* or *mental experiment.* Overt experimental behaviour in contrast is called *random behaviour* because such behaviour, although intentional, has low specific adaptation. It is wasteful of effort and frequently involves deadly risks. On the other hand, the elaboration of implicit responses prior to any overt reaction is the very essence of intelligent experimental behaviour.

Definitely organized perceptual patterns involve an analogous degree of advance in mental evolution. Such patterns involve a high plane of intellectual development which includes the building up, within the neural processes, of definite patterns which correspond in their arrangement and order with the arrangement and order of stimuli conditions. An illustration of the type of complexity involved is afforded by the " rhythm patterns " experimentally demonstrated in dogs by Pavlov and some of his associates, namely, Babkin, Stroganov, Grigorovitch, Ivanov-Smolensky and Eurman. Both simultaneous and successive compound stimuli were investigated successfully.

" The compound stimuli investigated were of many different kinds. In some cases the compound was made up of successive repetitions of one and the same stimulus. For example, a definite tone was repeated three times for one second with an interval of one second between the second and third ; this rhythm was repeated after a pause of five seconds, and was now accompanied by the unconditioned stimulus. In other experiments the stimulatory compound was made up of three or four different

stimuli all belonging to one analyser (*i.e.*, sense category); the stimuli were made to succeed one another in a definite order, being each of equal duration, with equal pauses between them. There were used, for example, in one case the four tones *C*, *D*, *E*, *F* of one octave; and in another case the four different stimuli were made up of a noise, two different tones and the sound of a bell. Finally, in other experiments there was employed a stimulatory compound composed of three or four different stimuli belonging to different analysers, each stimulus being of equal duration, the pauses between them being also equal. Conditioned reflexes were readily obtained to all these different compound stimuli, and after a certain amount of practice of the reflexes all the individual components when tested singly were found to exhibit a positive conditioned effect, which varied in magnitude according to the quality and relative strength of the individual stimuli.

"The next step was the introduction of different modifications of these compound stimuli. In the first case the order of the two pauses between repetitions was reversed, the longer pause being now made between the second and third applications instead of between the first and second. In the remaining cases the order in which the different stimuli were applied was changed, either completely by reversing it, or in the case of the compound consisting of four component stimuli by reversing the order of the two middle ones. These modified compounds were repeatedly applied without reinforcement, with the result that ultimately the original compounds became differentiated from their modifications, which latter finally lost their positive conditioned effect and acquired an inhibitory one. . . . The experiments show that *a compound stimulus the component units of which remain in themselves unaltered*, and consequently most probably affect the same cells of the cerebral cortex, *behaves in different modifications as a different stimulus*, evoking in these cells now an excitatory process, now an inhibitory one." [1]

[1] Pavlov, *Conditioned Reflexes*, pp. 145-47. (Italics mine.)

Such functional differentiation of various patterns of the same stimulus units must involve the organization of some sort of neural patterns which function in the correlation of activity and which correspond to the patterns of the external situations. It would follow that these physiological patterns might also operate, *if* sufficiently distinct, as definite implicit reconstructions of absent situations, or memories. But there the important distinction between intentions and memories needs to be emphasized. Intentional patterns are sustained in excitation by definite visceral processes, and, therefore, acquire a distinct and dominant rôle in the control of behaviour. On the other hand, the ordinary *perceptual* patterns have no such sustaining control. Therefore, they are highly *fluctual*. The evidence seems to indicate that fairly definite intentions may be functional in organic activity at a considerably lower stage of intellectuality than the definite memorial reconstruction of perceptual experiences. The operation of " intention " is apparent in any successful " delayed reaction " experiment with animals ; but there is no clear *evidence*, so far as I know, that any infra-human animals are able to correlate perceptual reconstructions of absent situations (*definite memories*) with such intentional patterns, and so solve puzzles involving the intellectual treatment of absent situations.

VII. The capacity to experiment intellectually with situations not immediately perceived constitutes what may be appropriately labelled *free intelligence*. This represents *a further developmental stage in the evolution of intelligence and is apparently dependent upon the organization of symbolic activity comparable to human language activity*. This does not involve the assumption that an adult human being cannot solve quite elaborate problems in sensory schemata, such as geometrical figures—although there is ample introspective evidence that this is not usually the case. But it does involve the assumption that the develop-

ment of such distinct perceptual schemata, capable of *systematic exploitation* in relation to definite problems, is itself dependent upon verbal or gestural activity. This can certainly be shown to be true, for example, in the case of complex spatial schemata.

There seem, however, to be certain *approximations* in pre-verbal activity to genuine "free intelligence". In the first place, perceptual patterns which are closely related to an immediate situation may supply a functional intellectual context, of a purely sensory or intuitive character. In one sense of that loose and ambiguous term "meaning", such acquired perceptual patterns may function, apparently, as meanings in organic response. Thus, acquired but purely non-symbolic intuitive patterns may *enlarge, reinforce, inhibit or reconstruct* the clues actually afforded by the immediate situation. Again, it appears, very familiar and clear-cut perceptual patterns, only remotely associated with the immediate situation, may apparently be occasionally inserted into the intellectual manipulation of a problematical situation, as in case of Tschego's spectacular use of the blanket in the illustration from the *The Mentality of Apes* given below—just as the "mental picture", or "reminiscence" of a situation, which may never have been verbally or schematically organized may "pop into a person's mind" through any transient association.

"After useless efforts to reach the bananas with her arm, Tschego jumped up, went quickly to her sleeping-den, which opens into the cage, and returned at once with her blanket. She pushed the blanket between the bars, flapped at the fruit with it, and thus beat them towards her."[1]

It is obvious that the apes described by Köhler are very intelligent animals, and that they do a good deal of thinking about the situations they encounter. Nevertheless, it is clear that, for the most part, their thought can

[1] Köhler, *The Mentality of Apes*, p. 35.

only move " one step " away from the immediate situation, so to speak. As Köhler points out, only patterns which lie on the fringe of the immediate situation can enter into the experimental processes :

" I have already expressed the opinion that ' the time in which the chimpanzee lives ' is limited in past and future. First of all the number of observations is small in which any reckoning upon a future contingency is recognizable, and it seems to me of theoretical importance that the clearest consideration of a future event occurs when the anticipated event is a planned act *of the animal itself.* In such a case it may really happen that an animal will spend considerable time in preparatory work (in an unequivocal sense), as when Sultan labours long to sharpen one end of a wooden board, so that it will afterwards fit into a tube, and he can carry out his scheme with the double stick. Where such preliminary work, obviously undertaken with a view to the final goal, lasts a long time, but in itself affords no visible approach to that end, there we have signs of at least some sense of future. To be sure, there is, in the example given the incentive of the *visible reward,* and all through his labour he could glance from time to time at the fruit; anyone seeing an ape making preparations for an anticipated future experiment, the conditions of which are not for the time in sight, would be witness of a still higher achievement in the direction under discussion. Then the consideration of certain *external* circumstances in the near or distant future, not only of self-planned actions, would operate as a condition of actual behaviour. I have not yet made any clear observations of *this* sort, nor, indeed have I purposely arranged any situations suitable for them." [1]

Apes, of course, are not incapable of talking because of any laryngeal incapacity, but because of " lack of imagination ". Chimpanzees have a wide range of spontaneous vocal expression. A few attempts have been made to teach chimpanzees to talk. One learned to say " papa " after six months of education (apparently with about as much significance as in the first real words of the child). Some experimenters have had a little better luck, others less.[2] It is possible that systematic instruction (planned in relation to the essential principles of language learning)

[1] Köhler, *op. cit.*, p. 282.
[2] Yerkes, *Almost Human*, p. 177.

might accomplish a little more in some cases. In this respect at least the adult chimpanzee seems about on the intellectual level of the year-old human infant, but in other respects, of course, his natural equipment is quite different. The normal human adult has, of course, a better brain than the ape and a superior native organic intelligence, apart from the intellectual structure contributed through membership in a more or less "civilized" community and the acquisition of language processes. Herrick quotes Elliott Smith to the effect that "in the larger anthropoid apes the projection centres are as extensive as in men of equal body weight, though the cerebral hemispheres as a whole are only half as heavy as the human." [1]

VIII. Among human beings there is undoubtedly a good deal of intellectual activity and the operation of many random suggestions below the level of language organization. Dream life is essentially characterized by a high degree of dissociation, yet dream imaginations frequently include sensory patterns of a high degree of complexity and organization in cases in which it would be wholly artificial to invoke the hypothesis of prior verbal organization. Eidetic images, namely, revived perceptual processes which are accepted as immediate realistic experience, are apparently fairly frequent in normal children.[2] Some artists probably have unusually vivid imagery throughout life. It is recorded for example that William Blake was whipped as a child because he "saw" angels in a tree while out walking. And in his old age he drew spirit portraits of the Hebrew prophets. Undoubtedly a peculiar gift in his case made possible the intense imagery of his engravings and poems. Titchener reports that unusual sensory experiences have considerably affected his psychological interests and work. *There is, however, no evidence that perceptual processes which are organized wholly*

[1] Herrick, *op. cit.*, p. 273.

[2] Allport, G. W., "Eidetic Imagery," *Brit. J. of Psychology*, Vol. 15, pp. 99-120.

independently of symbolic processes and co-operative social activities make possible any genuine reflective thinking, or systematic mental experimentation with possible methods of handling situations which are not actually present. In fact, the evidence is all the other way.

There is no essential difference, of course, between communication carried out in manual gestures and communications carried out in language acts, except that the latter is tremendously more convenient, and historically has been the basis of the development of human culture and human mentality. Deaf-mutes who talk with one another manually communicate *ideas* which they owe to linguistic community. Helen Keller is indebted for her intellectual development to the linguistic community of the European culture quite as much as any of the rest of us. A skilled thinker in words was needed to teach Helen to think in gestures, effectively, although she had previously acquired a few elementary items of communication in association with her parents, before systematic instruction. In this connection it is interesting to find that the manual alphabet, used by deaf-mutes, was not invented by them but by people who talked, for the purpose of secret communication and the subvention of the vow of silence in certain monastic institutions. It was first taught to mutes, apparently, in Spain in the sixteenth century.[1] It would be, however, a gross error to suppose that congenitally deaf children (especially if they have sight) are not able to develop a considerable primitive gesture language, in co-operation with their parents and friends, or even with one another,

[1] Arnold, *Education of the Deaf*, p. 8. Aristotle held out no hope for the congenitally deaf. Pedro de Ponce (d. 1584) seems to have been the first to teach mutes a systematic gesture language. He wrote with just pride: "In this house of Ona, I have had for my pupils who were deaf and dumb from birth, sons of great lords and notable people, whom I have taught to speak, read, write, and reckon; to pray, to assist at mass, to know the doctrines of Christianity, and to know how to confess themselves by speech . . . from all of which Aristotle excluded them."

and to think in these gestures. But such spontaneous symbolism never attains to the efficiency of an artificial system of manual signs constructed on the basis of spoken language. However, with the co-operation of intelligent adults (who have acquired the racial culture) this "natural" sign language may attain to a considerable excellence and serve as the foundation for fairly complicated intellectual activity. William James, on the basis of a deaf-mute anecdote, affirmed that "A deaf-and-dumb man can weave his tactile and visual images into a system of thought quite as effective and rational as that of a word-user." [1] He cites the speculations of a deaf-and-dumb child, reported in later life after he had learned artificial sign language. Reports of childhood experience after a lapse of thirty years are not the best evidence in the world. Moreover, upon reading the record, we find that this child had acquired a quite intricate gesture symbolism in communication with his mother as is indicated by the following quotation: "I remember that my mother once told me about a being up above, pointing to the sky. I asked if it were the sun, the moon, or one of the stars," and so forth. The following year James published further evidence in support of this position, citing another account.[2] In this account the deaf mute reports that he was transferred at the age of five from his mother, who had understood and ministered to his needs without very much development of sign communication, to the care of another person who could not thus read his wishes and was forced to rely upon the rapid development of a system of gestures. The sudden transformation was so remarkable as to be analogous to that whereby Helen Keller was introduced from her disordered little world into the great experience of intelligent living. Previous to the transfer, the child, according to his later report, cited by James, "could neither reason nor think at all, yet could recognize persons either with like or dislike".

[1] James, *Psychology*, Vol. I, p. 266.

[2] James, "Thought before Language," *Phil. Rev.*, Vol. 1, 613-624.

" Every sound around me," he reported, " seemed blank, except the momentary pleasures of perception. . . . After the transfer there came a sudden intellectual awakening." It is very wonderful to witness the release of " spirits in prison ", as one writer has picturesquely described the congenitally deaf, which may be affected by intelligent interest and the methods of modern science. Nevertheless, there seems to be some evidence to indicate that the thinking of deaf-mutes rarely attains a capacity for intellectual abstraction and the critical treatment of complex ideas equal to that of which the brothers and sisters who hear and speak are capable. This, however, may be overcome with intensive symbolic education and especially by training in oral language (as in case of Helen Keller). The necessity which the sign-thinker suffers of breaking up his thought into small units may be illustrated by a translation of the Lord's Prayer from manual language: " Father our—heaven in—name thy, hallowed —Kingdom thy, come—will thy, done—earth on, heaven in, as. Bread our, give us daily. Trespasses our, forgive —them trespass against us, forgive, as. Temptation lead not—but evil deliver from—Kingdom, power, glory, thine, for ever." [1] Immanuel Kant, one suspects, would have had a good deal of difficulty in working out the *Critique of Pure Reason* in such a syntactical apparatus.

W. Frohn published in 1926 [2] one of the few records of careful experimental work on deaf and dumb children. His experiments, however, were limited to a small number of cases, and must be accepted with caution. They probably afford the best statement at present available, however, of the intellectual traits of the deaf and dumb. His conclusions are:

(1) The deaf-and-dumb child does not have as high intellectual faculties as the normal-hearing child of the same age. And concrete materials predominate in his

[1] Arnold, *op. cit.*

[2] *Archiv für die gesamte Psychologie*, Vol. 55.

thought, with a retardation in capacity for problem solving, and a preponderance of sensory imagination.

(2) This retardation in intellectual faculties is caused by retardation of verbal development.[1]

Frohn compares his conclusions on the thought life of deaf-and-dumb children with that of primitive people, as formulated by Kafka, where the same inferiority of symbolic mechanisms is operative (due in the latter case to the inferiority of the cultural medium, of course): "As regards vocabulary, one cannot describe the speech of even the most primitive people as meagre in expressions. Only, if we examine the stock of words more closely, we are struck by the concrete sense of the expressions. They seem to be bound to the narrow reality of a small space and its life relations; the manifoldness of appearance is still less classified and brought together under common viewpoints. . . . A pronounced instability of expression predominates." [2]

It is fairly obvious to anyone giving the matter any serious consideration at all that there are some types of adaptation and the organization of experience which take place below the language level and other types which are dependent upon words. Any well-developed animal interested in something on the other side of a deep stream might feel the irritation of the problem and hunt up and down the stream for a narrow place to leap across. And anthropoids with well-developed brains might adopt the use of vaulting-poles. On the other hand, it is certain that no one could appreciate the function of vitamins or count the number of bacteria in a sample of water apart from linguistic equipment. It is not easy to draw a sharp line beyond which mental capacity is dependent upon "symbolic education", but the following tentative

[1] Frohn, W., "Untersuchungen über das Denken der Taubstummen," *Archiv für gesamte Psychologie*, Vol. 55, p. 520 n.

[2] *Ibid.*, Quotation from Kafka, *Handbuch der vergleichenden Psychologie.*

conclusion seems warranted at this point: The capacity to hold a problem, not immediately enforced by an actual perceptual situation, distinctly in mind, to consider suggestions, and to choose between favourable and unfavourable solutions, in short, what may be properly called " free intelligence ", the capacity to *use* ideas as units in intellectual experimentation, is dependent upon the acquisition of words, or other symbols which are derivative from linguistic cultures. The further studies in the development and actual functioning of words in life will make possible a much more accurate appreciation of the rôle of words in the evolution of the structure of mind.

CHAPTER II

GROWTH OF VERBAL ACTIVITY IN THE LIFE OF THE CHILD

I. It is conceivable that a considerable symbolic culture might eventually have been achieved among a silent race, if the splendid brains of the superior anthropoid apes, or better, had developed in animals without vocal equipment. Brains being fairly well matched, however, a race having the advantage of *voice* would have rapidly outstripped any other. Noises made in the throat and head are peculiarly fitted to become instruments *par excellence* of social life and rationality, because of their ease of production and social efficacy. This is not true of such noises as those which insects make by rubbing the legs or the drumming of partridges; the production of such noises interrupts all other activity, and these must, therefore, be naturally selected as the specific instruments of specific functions, such as love-calls and signals of alarm. Movements of arms, fingers, and other visible organs, which may function socially as gestures, have fixed relations in movement systems which are established in the vital economy of the individual animals; such movements, if specially developed as gestures, not only interrupt activities in the producer but require the previous visual attention of the party addressed or else his presence within arm's reach. But voice is simply *modified breathing*—and the breath is passing in and out of the body every moment, whether or not we utilize it as a play activity to amuse ourselves and a mode of communication. So to utilize voice requires little if any physiological equipment which is lacking in other of the higher animals. It does require the plasticity of character which prompts gurgling, cooing and other forms of vocal play, which are only present in

very highly developed animals. Above all it requires a span of intellectual correlation which eventually makes possible the inclusion in thinking of various definite patterns involving particular sounds, spoken and heard, in fixed relation to particular types of social situation and behaviour. With slight effort a continual stream of vocal activity can be poured forth, as an accompaniment of other activity, which affects all persons in the vicinity whatever they may be doing—a fact which is frequently made the subject of unfavourable comment. Moreover, a wide variety of effects may be produced by slight changes of control. This is well illustrated by the fact that phonetic experts tell us that the infant in his babbling covers the whole range of sounds utilized by Russian, Gaelic and Polynesian dialects. Voice thus supplies a wealth of materials available for effective communication, to be had by the pursing, closing and opening of the lips, the lifting and tossing about of the tongue and slight laryngeal contractions.

Vocal activity is a spontaneous feature of the infant's career. But this vocal activity does not play any particular rôle in the organization of the child's social relations and intellectual habits until it has been transformed by the operation of social processes into verbal activity, *i.e.*, into an instrument of communication and thought. The growth of *vocal activity*, as such, passes through three distinct phases in early childhood: (1) The period characterized by fixed types of *crying* and other elementary vocal reflexes, mostly but not wholly, in reaction to disturbances such as hunger, thirst, fatigue and pain, and serving the biological function of a signal for social attention; (2) the period of babble or *lallen*, to use the neat German word, characterized by a wide range of spontaneous vocal variations and experimentation, largely expressive of energy and exuberance, a form of "play" —the period in which the fundamental kinesthetic- and auditory-vocal organization (which is predominantly kinesthetic-vocal) is established in the child's habit

systems; (3) the perfection of the *auditory-vocal system* which supplies the basis of vocal imitation and the acquisition and facile use of elaborate conventional linguistic patterns (the conventional syntax, balance and rhythm of speech). The growth of *verbal activity*, as such, involves two further distinct phases; (4) *nominal integration*, the establishment of definite relations between specific unitary vocal patterns (words) and other specific patterns of perceptual situations and social and personal behaviour; and (5) the intellectual organization of significant *interrelations within symbolic processes* (functional syntax, abstraction and the symbolic structure of reason). The present chapter will deal with the growth of vocal activity and the transition from vocal play to significant verbal activity.

II. *Physiologically, voice is best described as a form of modified breathing.* The lungs, diaphragm, thorax and trachea may be called the primary organs of speech. And the organs by which breath is modified so that varied sounds are produced, the larynx, jaw, tongue, cheek, palate and nose may be called the secondary organs of speech. Except in so far as they are organs of respiration, most of these organs are instruments of nourishment. Some of them like the palate and parts of the larynx are primarily adapted to secure the harmonious utilization by breath and food of the same tracts—thus they were already "instruments of mediation", so to speak, before they became organs of communication. Only one definite organ seems to have been primarily differentiated in relation to sound production, namely, the glottal lips, or "vocal chords". These are two masses of membrane in the upper part of the windpipe which, as they are brought near together and stretched taut, modify the breath and set up vibrations by constricting its passage between the trachea and the system of resonating chambers in the upper throat, nose and mouth. The glottal lips are regulated by muscles attached to

cartilaginous structures in the cavity walls (" the intrinsic musculature of the larynx "). This entire organ, including the cartilages and intrinsic musculature, is moved up and down, effecting adjustments between the trachea cavity and the throat cavities, by muscles (" the extrinsic muscles of the larynx ") reaching up to the hyoid bone at the base of the tongue and down to the sternum. A cartilaginous organ, the epiglottis, is adapted to closing off the larynx and respiratory system from the throat during the act of swallowing. The entire system, including glottis, cartilages, intrinsic and extrinsic musculatures, and epiglottis, is referred to as the larynx by anatomists and forms the " Adam's apple " of more popular physiology.

The Stoics, according to Galen, had a saying: " It is evident that the voice cometh from the mind; it is evident also that it cometh from the larynx; hence—the mind is not in the brain." As a matter of fact, however, the larynx is less important in the control of voice than the organs of upper throat, nose and mouth, especially the tongue. The larynx normally supplies the strong vibrations which give the voice its carrying power. Also, the degree to which the glottal lips are brought together and stretched taut is the primary factor in the determination of pitch, which is further affected by changes in the position of the entire larynx and also by action of throat, nose and mouth organs. The control of the upper throat, nose and mouth cavities is, however, chiefly responsible for the determination of the various vowel qualities.

Speech must not be thought of, organically, as made up of individual elements such as vowels and consonants, or even syllables. Speech must rather be thought of as a fluctuation, or series of stresses in the ordinary processes of breathing and throat adjustments, involving over a hundred distinct muscles, each normally characterized by varying degrees of tonic contraction, and each involved in a complex system of innervation and interadjustment with other organic systems. " To the ear speech is one

continuous flow; even the pauses are just as effective mental elements as the sounds; an attempt to pick out elements of speech by the ear modifies and alters them from the sounds actually occurring. On the motor side the fusion is just as complete; there are no distinctly marked volitions for successive sounds, but a course of volition resulting in a course of movement. Speech cannot be considered as made up of separate elements placed side by side like letters. In the flow of speech it is just as arbitrary a matter to consider certain portions to be separate sounds as to mark off by a line where a hill begins and where the plain ends."[1] Likewise, a sharp marking off of syllables as separate elements of speech is equally arbitrary. Syllables are best regarded as "centres of energy" in the flow of speech. Conversation, as instrumentally recorded on a smoked drum, exhibits this fluctual character, revealing few sharp breaks or violent transitions.

III. The fact that the new-born babe's first conspicuous act is a *cry* has been the theme of considerable romance and some research. Jessie Fenton has made an interesting summary of the whole subject, which is worthy of full quotation:

"The new-born baby is by no means entirely helpless and vegetative; he is able to perform a number of activities from the moment of birth. Indeed many reactions have been developed, or rather have been possible, for some time before birth, since babies born prematurely possess them. Usually the first, and always the most insistent act of post-natal life is a cry, a thin, persistent, monotonous wailing or screaming. This is usually uttered on a flat, shrill a-a sound, but it is not true, as popular theory would have it, that babies the world over invariably announce their entry into life with the same sound, for instances of practically all the sounds that can be formed by the baby's vocal organs have been observed as the birth cry.

"The fact that a wail is so frequently the first act of humankind has in past times seemed of peculiar significance to philosophers and psychologists. The range of interpretations that have been advanced is amusing. Schwartz thought it a shout of

[1] Scripture, E. W., *The Elements of Experimental Phonetics*, p. 446.

joy. Kant avers that 'the outcry that is heard from a child just born has not the tone of lamentation, but of indignation and aroused wrath; not because anything gives him pain, but because something frets him; presumably because he wants to move and feels his inability to do so as a fetter that deprives him of his freedom.' Says Adler: 'It is an expression of its overwhelming sense of inferiority on thus suddenly being confronted by reality, without ever having had to deal with its problems.' Miss Shinn quotes the rhapsodies of Semmig, one of the earlier German observers: 'Heavenly music of the first born!' he exclaims, 'sacred voice of life, first sound of the poem of a heart, first note of the symphony of human life, thou echo of God's word! What sound is like unto thee? . . . The cry of the baby is music! When it is still, especially in the night, one is uneasy; one longs for this primitive expression of the little being, and is consoled, enraptured, when the helpless creature breaks into loud wails, and says to us: I live, give me what I need! Oh, cry of the baby in the night, nightingale song for mother and father!'

"But nowadays we leave it to the poet to interpret the wail with which man enters life; the scientist contents himself with a simple explanation; namely, that the whole thing is reflex, implying nothing in the way of emotion or feeling. When air first strikes the delicate membranes of throat, nose, and lungs, a gasping breath results, which is given back in a cry, as automatically as a burned finger draws back from the fire, or an eye blinks when something approaches it. The particular arrangement of nerve connections that produces crying is an inherited one, and is particularly ready to be set off by any slight stimulation to baby's nerves. If the sudden contact with air does not start the reflex cry, the doctor administers a sharp slap or otherwise causes a nervous shock which finds outlet along these nerve paths which set the crying (and hence the breathing) muscles in action. We find further evidence for the tendency for mere excess of nervous energy to be set loose in crying, without necessarily implying any emotion, in the fact that even in adults, who have acquired the habit of inhibiting such primitive impulses, crying may often occur in moments of mere increased nervous tension. In certain forms of mania, indeed, the slightest stimulus of any kind—even a kind word—may set loose violent weeping In infancy the easy release of the crying-reaction is normal and natural. Baby's cry, for some time after birth, must therefore not be taken too seriously, since it may indicate nothing more than the easiest mode of release for nervous energy. The power to inhibit this nervous release is acquired slowly, and for several years children are prone to go into paroxysms of crying for a

trifling or a serious cause alike. If anything occurs to make them cry at all, they cry as hard as they can, and most mothers have occasional anxious moments waiting until an outburst of screams and tears has subsided enough so that one may discover whether the child has really broken his arm or only bruised a finger. It may, however, be of comfort to the parent who cannot share Semmig's enthusiasm for the wails of his offspring to note that among the cases reported by Blanton, the only baby who, during his brief life of ten days, showed no tendency to cry was one born without a brain." [1]

Infantile crying *as an instinctive instrument* of social organization apparently has no functional variations, except perhaps in degrees of intensity. It is true that crying caused by mild irritation and fatigue can easily be distinguished from crying caused by pain and fright. And some writers claim to be able to distinguish four or five distinct types of cry. It is natural, however, that varying organic conditions should produce varying effects and differences between individuals are even more marked. The crying of different babies varies to such an extent that experienced nurses can distinguish the cries of a score of babies in the same room. It is improbable that differences in crying have any instinctive instrumental value, except the generalized function of a call to social attention. Gurgling and smiling, as they later develop, have an analogous generalized function of a call to social attention but without the element of alarm.

The sounds of the earliest crying are generally recorded as vowels or gutturals. This is, at first, surprising in view of the fact that gutturals are commonly said to be the latest development in the infant's phonetic system. The paradox is, however, only apparent. Some throat activity is involved in all vocalizations. The movements of palate, lips, and tongue tip, however, are capable of more simple isolation and more exact control than the muscular adjustments of the throat which are involved in the discrimination of gutturals. It is, therefore, natural that, although different guttural sounds may come first in the repertoire

[1] Fenton, Jessie, *Practical Psychology of Babyhood*, pp. 5-7.

of the little infant, such sounds are the last to become distinctly articulated and built into specific patterns conditioned to specific situations.

The following sounds were observed by Margaret Blanton during the first thirty days of the life of infants: vowels: o (owl), e, oo, a, a (father); consonants: m with a (ma), n (nasal), g, h, w, r, r (rolled), y.[1] Some of these sounds are among those which are apt to be most difficult of specific fixation, as registered both by the late age at which they may be still difficult for children and by their variable appearance in different languages. It is a general rule that the sounds which it is most difficult for the child to learn such as th, f, z, s, r, w, diphthongs, and breathings are the sounds which also vary most from language to language.

The sound made by the explosion of the lips is usually the first item to be spontaneously fixed as a distinct phonetic element in the vocal repertoire of the infant. It has two different types according to the position of the palate. When the palate is contracted the uvula is raised, closing off the nasal passages, and the air is forced through the mouth. In this case explosions of breath forced out between the suddenly opened lips give the sound *p*, as in *pa-pa-pa*. When the palate is relaxed the voice passes through the nasal chambers and acquires a nasal resonance. In this case, similar explosions of breath effected by repeatedly opening the lips, have a nasal quality, and give the sound *m*, as in *ma-ma-ma*. This latter vocalization characteristically develops at an early age as an alternative to crying, or as a preparatory stage of crying, in situations of mild discomfort, and is perhaps directly related to the sucking movement. The explosion with relaxed palate is, for some reason, a more elementary cry than the explosion with raised uvula. The *ma-ma* pattern is the most universal element in human language. It is interpreted in most languages as a cry for the mother, and

[1] Blanton, Margaret, "The Behavior of the Human Infant during the First Thirty Days of Life," *Ps. Rev.*, Vol. 24, pp. 456-83.

in a few languages as a cry for father, but the father generally waits to accept the *pa-pa* more characteristic of untroubled moods. In Latin, *mamma* means breast, as *pap* does in English. There is, however, one linguistic variant to the general application of ma-ma to parents. In some languages it survives as the word for food, as in the English *meat* which originally meant all food, Sanscrit *mansa*, French *manger*, and Danish *Mad*.[1] Rasmussen, being Danish, accordingly philosophizes on the observation that the child's first distinct vocable is a call for food.[2]

IV. Anthropologists have suggested that the racial origin of language is less to be attributed to the communication of need, which was conveyed by a few brief ejaculations, than to the repertoire of drama, song and dance, as vocal accompaniment of activities.[3] This theory finds corroboration in the fact that human phonetic systems are based less in the cries of infants than in their song. The stage of free play intervenes between the elementary instrumentation of fixed social utility and the higher instrumentation of minds and complex social organization. It is in the multitudinous spontaneity of infantile vocal play that language and symbolic thought are engendered.

Somewhere between the third and the tenth week a new sort of vocal activity, distinctly different from the crying of the first few weeks, becomes a conspicuous feature of the baby's life, *vocal play*, *babble*, or *lallen*. This activity is no longer primarily stimulated by irritations, hunger and pain but is a variable expression of the energy of life in moods of exuberance when irritating stimuli are absent. It is at first completely analogous to kicking, waving the arms, and wriggling. It furnishes similar kinesthetic sensations that arouse vital energies. It involves the gradual accumulation and co-ordination of various definite types of vocal behaviour which include the innervation of

[1] Jespersen, *Language*, p. 155.

[2] Rasmussen, *Child Psychology*, I, 79.

[3] Donovan, J., " The Festal Origin of Human Speech," *Mind*, Vol. 3, pp. 498-506.

abdominal, costal, laryngeal, nasal, glossal, labial and face muscles. The tongue, which plays a very minor rôle in the earliest infantile behaviour, except in sucking, soon becomes one of the principal organs of the new game of *lallen*. K. C. Moore, in this connection, makes the following observation regarding her baby: "By the end of the twelfth week he had begun to use his tongue which had hitherto moved but little in his mouth. Thereafter there was a rapid increase in the number and variety of sounds made by the child in crying and babbling."[1] Shinn, however, reports great activity of the tongue as early as the seventh week.[2] Eventually *lallen* becomes a joyous activity, an end in itself, an infantile art—a music which is the common joy of the most primitive and the most sophisticated peoples, and which is basic in more elaborate arts, song, symphony and poetry.

The first phonetic activity of the infant is necessarily largely of a reflex character, based in innate neural patterns or connections. But these innate patterns are gradually transformed through the re-conditioning of vocal reflexes in growth of vocal activity. The organization of new patterns of vocal response includes both kinesthetic and auditory factors. Thus there is gradually built up within the life of the child an extensive *kinesthetic-* and *auditory-vocal* organization of phonetic activity. But, although both kinesthetic and auditory factors are integrated in this organization, the *kinesthetic* is probably the primary factor in the organization of vocal activity and has been the most neglected in theoretical treatments of speech development. It is now known that muscular movements stimulate internal nerve receptors which carry various stimulus patterns back to the co-ordination and correlation centres of the nervous system. These are described as "muscle sensations", or kinesthetic stimuli. A situation which evokes a specific type of vocalization once is apt to evoke its repetition. When this happens,

[1] Moore, "Mental Development of a Child."

[2] Shinn, *Notes on the Development of a Child*, Vol. 1, p. 136.

the kinesthetic stimulation and also the auditory sensations coming from the first vocal act become included in the specific situation which evokes the second vocal act, whether identical or different. Thus, *chains* of vocal responses which include many repetitions are built up. A strong tendency toward repetition and reduplication is, therefore, apparent in the lallen of infants and the talk of small children; and the survivals of this tendency are registered in the reduplications of adult language.[1] This is, in part, similar to the theory of "circular imitation," set forth by Baldwin;[2] but the earlier accounts of the genesis of verbal activity largely neglected the kinesthetic factor, and were ambiguous in their use of the concept of "imitation".

V. Gradually, however, more and more definite types of auditory analysis and synthesis are established, which constitute what Scripture has called "the basis of aural perception", and become more and more dominant in the elaboration and regulation of vocal activity.[3] There is gradually built up a specialized *auditory-vocal system* within the total organization of phonetic activity. This special auditory-vocal system is originally a modification and elaboration of one phase of the more fundamental and inclusive phonetic system; eventually, however, it becomes a principal factor in the further development and the constant regulation and control of all linguistic activity.

The first infant crying and even the early stages of lallen may be regarded as originally independent of auditory factors altogether, although auditory patterns probably mingle to some extent in the organization of vocal activity from the first in children who have normal hearing. Gradually, however, these auditory factors become a more and more important phase in intensifying

[1] Rasmussen, *op. cit.*, I, 83.
[2] Baldwin, J. M., *Mental Development in the Child and in the Race.*
[3] Scripture, *op. cit.*, p. 113.

interest in vocal play and regulating its course. This generalization is supported by the vocal behaviour of deaf children, as well as by other considerations which will be further developed later on. " The cry-period of the deaf child develops exactly in the same fashion as with normal-hearing children. After that, gradually, in fact indistinguishably at first, auditory patterns come to play a more and more dominant rôle in stimulation and control of vocal habits in the case of the normal-hearing children. Accordingly, there is not such a clearly marked ' lall-periode ' in children congenitally deaf as in normal children ; in fact, in the largest percentage of the congenitally deaf this phase is conspicuously diminished, or even wholly missed by the parents." [1]

The constant *impress* of the phonetic patterns of the surrounding conversation probably plays a part in the elaboration and fixation of definite types of auditory pattern in the infant's life. The French phoneticians have especially emphasized this *emmagasinement* of linguistic patterns as a powerful factor in establishing conformity of the child's " phonetic system " to the " phonetic system " of his particular neighbourhood and national language.[2] However, it is equally true that auditory habits are to a large degree dependent upon the differentiation of vocal patterns in motor processes. It is a notorious fact that persons suffering from minor lisps and speech defects or having a strong provincial or foreign accent cannot hear their own speech peculiarities. Teachers in speech clinics ordinarily proceed to train correct habits of articulation by bringing conscious attention to bear both upon motor factors in sound production and upon auditory distinctions. The deaf may be taught correct pronunciations by use of various devices for establishing definite types of motor habits ; and those who are only partially deaf are thereby aided in auditory perception.[3] In general

[1] Gutzmann, Hermann, *Die Sprachentwicklung des Kindes und ihre Hemmungen*, 1902. *Kinderfehler*, Vol. 7, p. 207.

[2] Grammont, Ronjat, Pavlovitch, Delacroix, and others.

[3] Blanton, Margaret and Smiley, *Speech Training in Children.*

the differentiation and integration of various auditory and vocal patterns develop *pari passu* in the child who has normal hearing, and auditory and vocal systems constantly interact.

The effective development of the auditory-vocal system as an independent mechanism of vocal activity is usually well advanced by the end of the first or the middle of the second year. In some cases, however, it may be seriously delayed in children who are otherwise well advanced in general intellectual development. The gradual constitution of this perfected auditory-vocal integration supplies the phenomena which have long been recognized but left unexplained, the phenomena of *vocal imitation.*

It may be noted that auditory-vocal integration makes two different and very important contributions to the growth of linguistic activity: (1) it makes possible the incorporation of new *unitary phonetic patterns* (words, or distinct vocables) into the child's vocabulary, when these are introduced by an adult in some definite context, and (2) it supplies *the basic mechanism of the habitual patterns of idiom, conventional syntax* (as distinguished from functional syntax), *balance, cadence and rhythm of speech.* The last-mentioned function, however, is genetically prior to the first—that is, some influence of auditory patterns in the grouping and rhythms of vocal play in the infant may be observed prior to the appearance of the capacity to repeat a new unitary phonetic pattern introduced " out of whole cloth " by an adult.

There has been considerable controversy as to whether or not children acquire language by *imitation.* But the controversy seems to have been largely misconceived. There is no necessity for appeal to an alleged " instinct of imitation ". Neither is there any warrant for a theory of piecemeal conditioning of each atom of vocal reaction to some atom of auditory stimulus. Vocal systems and auditory systems are built up in organic interdependence. Auditory patterns come to have a control over vocal patterns without the necessity for each specific vocal

response to have become separately conditioned to each specific sound. The most careful records, as, for example, the account given by William and Clara Stern of the speech development of their three children, Hilde, Günther, and Eva, afford evidence of several distinct phases of auditory-vocal organization, which are usually described altogether as "imitation"—(1) particular conditioned vocal reactions, (2) operation of overhead speech rhythms and cadences, (3) echolalia, (4) metalalia.

(1) Specific vocal reactions which are spontaneously produced by the infant may become *conditioned* to the same or associated sounds made by parents who have joined in the vocal play of the baby. Later when the adult repeats these sounds they may arouse the original vocal responses in the infant, who then appears to be imitating his parents—although, of course, in this case, it was originally the adults who did the imitating. Stern reports observations which seem to establish this process as early as the fourth month,[1] and Allport has given a very lucid description of this process, but overstates the case by saying that all apparent imitation during the first eighteen months can be explained on this basis.[2]

(2) Again, before there is any evidence of specific imitation by the child of new sounds introduced by adults the distinct influence of overheard *rhythms* and cadences may be observed. Stern reports, in the eighth month, the influence of special phonetic patterns introduced by an adult but made up of syllables which were included in the spontaneous repertoire of the child.[3] My observations, mentioned below, confirm the operation of this type of imitation before the end of the first year.

(3) The type of auditory-vocal process which is most properly described as "vocal imitation", the imitation by

[1] Stern, *Kindersprache*, pp. 150-53.
[2] Allport, *Social Psychology*, p. 186.
[3] Stern, *op. cit.*, p. 83.

the child of definite phonetic patterns introduced by an adult, may appear toward the end of the first year, or early in the second year.[1] It may, however, in unusual cases not appear until the fourth year in children of good general intelligence. It may perhaps be considerably affected by innate differences in auditory apparatus. It is probable that the delay in the development of this process is the principal cause of serious retardation of speech development in children of normal intelligence. This process, when it appears in isolation from other language processes, is called *echolalia.*

(4) The impress of auditory patterns is, however, normally integrated with the impress of the other patterns of the context in which they appear. This is, as will appear in the sequel, closely related to the processes involved in the origin of full verbal activity. Stern has coined the word *metalalia* for this type of " imitation ", in which a vocal response is imitated which conforms, phonetically, to sounds which have frequently been repeated as an integral part of some familiar situation which the child has heard. For example, little Hilde Stern first said " Nacht ", without any immediate precedent on this particular occasion, as she was carried to the door in the evening in the exact situation in which she habitually received the farewell " Gute Nacht " from the adults present. In this case Hilde supplied the phonetic element, before anyone else had spoken it. Thus she herself " completed the situation ", which otherwise would have lacked its familiar pattern. Here the " imitation " of the phonetic pattern is conditioned by the associated circumstances.

In a series of ten systematic half-hour observations of a ten months' old baby, Diane, who was living in my home at the time, (in which I recorded all of the child's utterances and all phonetic elements introduced by me and repeated in various patterns) I was unable to find any

[1] Stern, *op. cit.*, p. 153.

clear case of the repetition of new phonetic patterns (vocal imitation, or echolalia). I found, however, evidence of the influence of rhythmic patterns which I framed out of the syllables which the child was using spontaneously, such as ha-ha-ha, or ha-ha, ha-ha, when the baby happened to be playing with this sound. At this period, also, Diane had acquired several distinct conditioned vocal reactions, which I had established by repeating elements of her own familiar usage while she was actually using them spontaneously. These included a cough, a blowing of the lips, and a gentle but audible exhalation of the breath. I was able to evoke any of these reactions quite easily at this time, although not certainly by any means. When the same baby was fourteen months old (but no longer living in our home), I asked the mother to repeat on successive mornings, during five minutes, a wholly new, arbitrarily chosen phonetic combination (*a-b-c-d*). For four mornings there was no response by the child. On the fifth morning, however, she repeated the entire pattern, slurring only the third syllable. These observations apparently indicate that, in Diane's case, conditioned vocal reactions to auditory patterns and the influence of overheard rhythm (*i.e.*, types 1 and 2, as listed above) were fairly well developed at least as early as ten months of age, and the imitation of new phonetic patterns (*i.e.*, type 3) was lacking at ten months but was operative at least as early as fourteen months.

Retarded speech development evidently due to slow development of auditory-vocal integration in children of good general intelligence is a fairly common phenomenon. Such cases are reported by Stumpf, Stern (in the case of his second child, the boy Günther), and Nice (in the case of her niece, A.).[1] All of these cases are characterized by highly developed " speech understanding " (which will be discussed later), prior to the ability to talk, and by rapid

[1] Stumpf, " Eigenartige sprachliche Entwickelung eines Kindes," *Zsch. f. päd. Ps.*, Vol. 3. Nice, " A Child who would not Talk," *Ped. Sem.*, Vol. 24. Stern, *op. cit.*

acquisition of good language habits once the capacity for imitation of new sounds is established. Stern reports that Günther had, at the first, advanced in "speech understanding" even more rapidly than his older sister Hilde, but was unable to talk until finally "the bond was broken as with a magic stroke". Nice's niece A. and Stumpf's son both developed, with the co-operation of the family, special vocal symbols which they learned to use while still unable to use the mother tongue. For example, Stumpf's son had barely learned at one year and eight months to use "papa" and "mama", after strenuous efforts by his parents. However, he adapted various spontaneous vocalizations to definite situations with the aid of his parents, who accepted and developed these usages. At the end of the second year there were very few recognizable reproductions of adult speech, although he understood a large part of what his parents said to him and could combine his own words into sentences. He called his brother Rudolph "ulul" and his toy horse "hoto". Even at the beginning of the fourth year few of his words bore much resemblance to the correct German which was the only language spoken in his presence. With his improvised words he would build elaborate sentences, with original constructions, such as "Ich ulul hoto wapa" for "Mein Rudi Pferd umgeworfen" (Rudi has thrown my horse") and "ä krah ä bu, weich krah haja bu" (black soldiers in the black box, white soldiers in the pretty box). At the age of three years and three months he suddenly began to reproduce correct German. The nurse had been taking him out for a walk. She returned to say excitedly, "Liki has begun to talk". His parents entered his room, and found that he was able to repeat everything said to him with very few mispronunciations. At first, in actual conversation he continued to use his old system, using German words only in repetition or random utterances, but he made rapid progress now. The old words stayed in use for a time but were gradually replaced by correct German.

The retarded development of auditory vocal co-ordination may be primarily due to factors of auditory perception or primarily due to lack of adequate muscular co-ordination in speech production. The sudden burst of correct speech seems to indicate that there has been a considerable *emmagasinement* of auditory patterns which for some reason have not been available for speech control. (The subject is one which needs further investigation.)

The appearance of *echolalia*, the isolated operation of the auditory-vocal mechanism, has been commented on by many writers on child language activity. It plays an important rôle in the acquisition of conventional patterns of syntax and traditional linguistic idioms of all sorts. " Clearly much is repeated without being understood, much, again, without being more than half understood. Take for example (translated) :

> " Shall I carry you ? . . . Frans (1 : 9) : Carry you.
> Shall mother carry Frans ? . . . Carry Frans.
> The sky is so blue . . . So boo.
> Shall I take an umbrella ? . . . Take rella." [1]

In certain idiots and imbeciles, this process is very conspicuous in cases where it is well developed but where other phases of verbal activity have been arrested.[2] Clara Town, in a study of the characteristic verbal behaviour in the low levels of intelligence,[3] reports the presence of conspicuous echolalia in 17 out of 90 low-grade imbeciles (19 per cent.). On the other hand, some children classed as imbeciles may show considerable speech understanding but be peculiarly deficient in auditory-vocal co-ordination. For example, one boy described by Town, was able to use 216 words but his speech was entirely unintelligible apart from its context. Imbeciles also show the distinction between " verbal understanding " and " verbal speech " which appears in the origin of significant language

[1] Jespersen, *op. cit.*, p. 135.

[2] Hollingworth, Leta S., " Echolalia in Idiots," *J. of Ed. Ps.*, Vol. 8, pp. 212-219.

[3] Town, Clara, " Language Development in 285 Idiots and Imbeciles," *Ps. Clinic*, Vol. 6, pp. 229-235.

activity in children—some of the retarded subjects being more advanced in verbal understanding, others in verbal speech.

VI. About the same age that the vocal-auditory system is being well established (toward the end of the first or the beginning of the second year) an even more momentous process is taking place: *nominal integration*, or *the growth of significant words: the integration of phonetic elements as fixed conditioned reactions to specific situations and as conditioned stimuli to specific types of social and personal behaviour.*

There are two fundamental types of organic relationship involved in the origin of words: (1) Certain unitary phonetic patterns become fixed as the conditioned reaction on the vocal plane to specific types of stimulation. This may be called *verbal speech.* For example, the child learns to say "Kitty" whenever a soft black thing runs across the floor, and is rewarded with kisses and smiles for doing so, or given the kitty to play with. (2) Certain phonetic patterns, when received as auditory stimuli or when formed vocally by the child himself, begin to call out definite types of emotional, motor and intellectual (implicit-experimental) response. This may be called *verbal understanding.* For example, the child learns to pull the blanket over his head when someone says "Peek-a-boo", and he soon shows that he expects it to be pulled off again without his effort.

At first, these two integration-processes appear as fairly distinct, but they are rapidly unified in the emergence of *words*, unitary-phonetic patterns integrated in their total organic contexts, including both the *conditioned-reaction relation of a word to perceptual context* (*verbal speech*) and *the conditioned-stimulus relation of a word to overt and implicit behaviour sequences* (verbal understanding). The total integration process may be described as *nominal integration*, or the rise of the capacity to use and understand words.

An illustration of the independent training of *verbal*

speech is given in Watson's account of an experiment with a six months' old baby [1]:

" My wife and I attempted to form a simple verbal habit in a very young infant. The experiments were carried out upon B. He was born November 21, 1921. Up to the end of the fifth month he showed merely the repertoire of almost every other child of that age. The cooing sounds, ' ah goo ' and variations of ' a ' and ' ah ' were quite pronounced. We began on the 12th of May to tie this sound up to the bottle (this infant was bottle-fed from the end of the second month). Our method was as follows: We gave him the bottle and allowed him to nurse for a moment, then we took it away and held it in front of him. He began to kick and squirm and reach for it. We next gave the stimulus sound ' da ' aloud. We repeated this procedure once a day for three weeks. When he began to whimper and whine we always gave him the bottle. On June 5, 1922, he said the word ' dada ' when we gave the stimulus word and held the bottle in front of him. The bottle was immediately given him. This procedure was repeated three times with success on that occasion—each time we gave the stimulus word. Then we took the bottle away five successive times and without our giving the stimulus word he said ' dada ' for the bottle. At one of the trials he kept on saying ' da da ' ' da da ' ' da da ' several times without our giving the stimulus word. Thereafter for several weeks it was as easy to touch off this response as to call out any other bodily reflex. The verbal response was confined almost exclusively to this one stimulus. On a few occasions he said it when his rabbit was held in front of him but not when other things were shown him."

The independent training of *verbal understanding* is illustrated by some experiments of Paul Schäfer with his young son [2]:

Schäfer experimentally established several definite overt reaction patterns to several sound patterns, experimentally introduced when his son was ten months old. In every case the motor response which became conditioned to a specific sound pattern (spoken by the investigator) was one which had previously appeared spontaneously in the child's activities, or had been established independently of the word stimulus. Schäfer intro-

[1] Watson, J. B., *Behaviorism*, p. 182

[2] Schäfer, Paul, " Beobachtungen and Versuche an einem Kinde in der Entwicklungsperiode des reinen Sprachverständnisses," *Zsch. f. päd. Ps.*, Vol. 23, pp. 269-89.

duced each sound pattern while the child was engaged in some specific type of behaviour or in connection with some motor activity. After several days the stimulus of the word alone was enough to initiate the activity. The following instances of verbal understanding were developed in Schäfer's son before the appearance of the first spoken word :

Pattern spoken by parent.	*Reaction established in Child.*
" Mache bauz ! "	Sways body back into pillow in carriage.
" Bitte, bitte."	Claps hands.
" Guckelicht."	Attends to light.
" Pantsche, pantsche."	Strikes water and splashes in bath.
" Wau-wau."	Attends to stuffed dog.
" Tick-tack."	Attends to metronome.
' Der schrank."	Strikes cabinet with hand.
" Klapper, klapper."	Shakes rattle.

Schäfer reports that most of the verbal understandings so established were unstable. One of these word patterns was also established as a speech reaction by a process essentially analogous to that described by Watson in the previous paragraph, and this continued as a fixed element in the child's vocabulary. The use of the sound patterns by Schäfer was discontinued after a month, and forty-five days later a test was made. It was found that the appropriate reaction was remembered for four of the phrases used in this test and lost for three others. After another lapse of thirty days the test was again repeated. This time it was lost for four, retained for two, and uncertain for another.

Verbal understanding and verbal speech develop in mutual interaction and are rapidly integrated in the complete relation of a word to its organic context. This relationship is the foundation of symbolic activity.

Because of the variety of factors involved in the origin of words it is rather artificial to attempt ever to say exactly what is the child's " first word ". Some parents apply this term to the first word repeated (vocal imitation); others mean the first words " understood ", ~~or~~ the first words " spoken ". However, Bateman's summary of records of the time of " first words " as reported in various accounts, covering 35 children, may be given for whatever it is worth [1] :

[1] Bateman, " Papers on Language Development," *Ped. Sem.*, Vol. 24, pp. 391-98.

Age in months.	Number of children reported as using "first word" at this age.
8	1
9	5
10	11
11	6
12	3
13	5
14	3
15	1

Some writers, under the spell of the moot problem of theoretical sociology, the relation of "self" to "society", have regarded "the first integration of the child as a self" as a fundamental feature of the rise of symbolic activity. Markey, in *The Symbolic Process*, has recently attempted to work out this thesis along behaviouristic lines. The treatment seems to me to involve a confusion between the use of words as symbols (as in ordinary adult conversation) and the explicit recognition of the symbolic character of a word, *i.e.*, the response to the word,[1] "on its own validity" as distinct from its use in symbolic reference. This particular act, which happens only occasionally in adult thinking, occurs at the earliest in the latter half of the second year. Markey accordingly says that there can be no "words" before the eighteenth month, and the origin of words is regarded as constituting a sharp transition in behaviour: "The first moment that such an integration occurs in the behaviour of a child must be a startling one. This flash of co-ordination, facilitation, inhibition, summation, and integration of responses which occurs in the behaviour mechanisms would be a novel and extraordinary experience". However, this startling moment is hardly an empirical event, as Markey recognizes: "Of course, it has gradual development in genetic growth".[2] Two chapters in *The Symbolic Process* and some very elaborate statistical compilations are devoted to the study of the rise of the use of personal pronouns, regarded as in

[1] Markey, *The Symbolic Process* (1928), p. 35.
[2] *Ibid.*, p. 36.

some sense a key to the whole problem of symbolism. However, Markey protests against a naïve identification of the use of pronouns with the " first integration of the child as a self ": " It would, of course, be quite naïve and illegitimate to claim, as some have done, that the first integration of the child as a self only arises with the use of the first personal pronoun. As soon as the first real symbol appears there must be some sort of personal differentiation involved in the behaviour of the child, particularly if the social factor is as important as has been already indicated. Even before the first symbol the child in his habits of adjustment has established a basis in action for such a differentiation of himself. He already has a ' parrot ' name for himself and begins some symbolic self-reference when the self and symbols have arisen, before the pronoun ' I ' appears." [1] Markey makes some very valuable suggestions, but the introduction of the concept of " the rise of the self " as the key to the origin of symbolic activity seems to me to obscure rather than to clarify the account. The origin of the self as a functional unit in behaviour is an interesting and important problem, on its own account, although it does not seem to me to be so complicated a problem as sociologists have generally assumed. The implicit differentiation of the self is carried out and emphasized through the symbolic differentiation of persons by names, and the more abstract differentiation by pronouns (the latter process being one phase of the later growth of abstraction in symbolic processes). However, it does not seem to me that the discussion of this problem supplies the key to the origin and nature of the symbolic process.

The utility of words in the processes of implicit, " intellectual " experimentation depends upon: (1) *the perfection of nominal integration*, the further establishment of more exact organic relations between definite unitary-vocal-patterns and situation and behaviour patterns, so that the word patterns may function as *foci* of or *substitutes*

[1] Markey, *op. cit.*, p. 78.

for the looser patterns of sensory imagination and intuition in the organization of intellectual processes; and (2) the *intellectual organization of symbolic processes in significant interrelationships*, such as functional syntax, systems of reference and inference, etc., and the growth of more and more intricate modes of correlation of these intellectual processes—to be discussed in the following chapters.

VII. *Four principal types of verbal organization* have been identified (although the last type, which does not usually appear until the latter half of the second year, has not yet been discussed):

I. The basic kinesthetic- and auditory-vocal organization of phonetic activity (predominantly kinesthetic)—based in a still more fundamental system of innate reflex patterns.

II. The specialized auditory-vocal organization which supplies the mechanism of vocal imitation and the control of the balance and rhythm of speech.

III. Nominal integration (which at first exhibits two distinct aspects: verbal speech and verbal understanding).

IV. The intellectual organization of symbolic processes in significant interrelationships.

The first three types of the organization of verbal activity may be illustrated by fairly distinct aspects of the vocal phenomena in a well-developed infant at the threshold of his second year of life, and all four types may be illustrated by an empirical analysis of various phenomena of *aphasia*.

The following is a record of the vocal accomplishments of my young friend, Diane, at the age of eleven months and ten days, classified according to the types of verbal activity just listed:

I. *Basic kinesthetic- and auditory-vocal organization of phonetic activity:*

Diane enjoys a wide range of characteristic vocal utterances and combinations (Lallen).

II. *Fixed auditory-vocal systems:*

She repeats "di-di", a cough, and a little grunt. (Original vocables which have been conditioned to the same phonetic patterns spoken by others). She repeats "cock-dul-do" (for "cock-a-doodle-doo"), introduced by others (Vocal imitation or Echolalia). When the teddy-bear is given to her and at the same time the word "teddy" is spoken in her presence, she repeats "teddy". (Metalalia).

III. *Nominal integration:*

(A) Verbal speech: When the cat comes into the room she says "kitty".

(B) Verbal understanding: When "kitty" is spoken by an adult she looks around for the cat. (In this case the use of the word, verbal speech, was noticed before the verbal understanding was noticed.) She responds with appropriate movements to:

"Pat-a-cake" (claps hands).
"So-big" (raises arms over head).
"Hi-hi-hi" (jumps up and down in carriage).
"Bye-bye" (waves hand).

This account of the factors involved in the use of normal speech may be checked against an analysis of the phenomena of the breakdown of vocal activity, or *aphasia*. The understanding of the nature of aphasia (the breakdown of normal processes of verbal activity) has been long delayed by two fundamental and persistent misconceptions. In the first place, under the influence of the dualistic conception of mind and body, a radical distinction was commonly introduced between "perceptual aphasia" (incapacity to understand the meaning of words) and "motor aphasia" (incapacity to carry out vocal activities). This statement is, of course, an oversimplification but it will serve our purposes—the subject has a long history, rich in confusion, and one could fill a considerable library with theories of aphasia. And in the second place, since it has been known for a long time that aphasia is most commonly caused by cortical lesions and

generally lesions in the left cerebral hemisphere, it appeared that the cortical organization of verbal processes is probably more or less related to the organization of manual activities in the use of the right hand—activities of the right limbs being organized in the left cerebral hemisphere, activities of the left limbs in the right cerebral hemisphere. This thesis was, however, overworked and vitiated by the theory of fixed, hereditary centres of cortical functioning (hereditary cortical localizations). The whole problem of cortical localization is still highly problematical, but it is now known that it is certainly not the fixed hereditary affair assumed in the old theories of aphasia. There are, however, *functional relationships* between the cerebral organization of verbal and manual activities, which is indicated by the occasional association of stuttering with mirror-writing, in cases of violent transition from left-handed practice to right-hand practice,[1] as well as by other phenomena related to aphasia. Similarly, it may be assumed that there are *functional centres* of the organization of various types of vocal and verbal processes, and the correspondence between types of verbal organization and types of aphasia points to such relationship.

There is a clear correspondence between the four main types of vocal and verbal organization described in the preceding sections of this chapter (listed above) and the four main types of verbal breakdown described by Head in his empirical analysis. The correspondence is all the more striking because Head's account is developed without any relation to any theory of verbal organization, purely on the basis of various characteristics exhibited by patients suffering from aphasia as a result of severe head wounds during the late war.[2] One caution, emphasized by the author must be kept in mind by the reader. These disorders have arisen from brain injuries usually involving

[1] Fildes and Myers, "Left-handedness and the Reversal of Letters," *Brit. J. of Ps.*, Vol. 13, pp. 273-78.

[2] See the account given in *Brain*, Vol. 43, Part 2 (1920), and afterwards published in Head's *Aphasia* (1927).

shock and complete mental disorder for a time. It would be naïve to expect to find rigid and clear-cut types of dissociation. General tendencies toward differentiation are, however, clearly apparent.

I. *Verbal aphasia* is, apparently, a breakdown of the basic kinesthetic- and auditory-vocal organization (which is predominantly a kinesthetic-vocal organization).

II. *Syntactical aphasia* is a breakdown of the auditory-vocal system (which underlies vocal imitation) and controls the rhythm and balance of speech. The term " syntactical aphasia " is somewhat ambiguous, however, as the intellectual organization of verbal activity (functional syntax) is not here at stake, but merely conventional syntax or idiomatic construction.

III. *Nominal aphasia* is a breakdown of nominal integration, as described above.

IV. *Semantic aphasia* is here interpreted as a breakdown of the more intricate intellectual organization of symbolic activity.

Head's own remarks on his classification are as follows :

" It has been universally recognized that the clinical manifestations differ greatly in individual cases of aphasia, and such differences have been attributed to a multitude of causes. I have attempted to show that they are produced by dissociation of a definite mental process, which I have called symbolic thinking and expression. They are not due to a loss of motor or sensory power, to destruction of images or to a diminution of general intellectual capacity, but are caused by the breaking up of one aspect of physical activity analogous, in a higher level, to the sensory dissociations, which may follow a lesion of the post-central cortex. Certain physiological processes necessary for the normal exercise of the functions of language are disturbed by organic destruction of the brain. At first, in consequence of the widespread effects of this injury, the patient may be unable to speak, to read or to write, but as this state passes away all aspects of the disordered function may not be equally disturbed ; some actions are not easily performed, and certain tests are carried out normally, whilst others are grossly affected. Such dissociation of symbolic thinking and expression is responsible for the clinical forms assumed by aphasia.

" To each of these clinical forms I have given a name chosen to indicate its characteristic verbal defects. But it must be remembered that, although the power of using words shows the most extensive and gravest disturbance, other actions are affected which have nothing directly to do with such symbols. The name applied to each group of aphasic disorders is drawn from a grammatical source, because it is in the use of language that the changes are most evident and characteristic; but the functions which suffer extend beyond the limits of verbalization."

It would be interesting to enter upon an elaborate discussion of this classification of types of aphasia in the light of the preceding discussions of the growth of vocal and verbal activity, but the limits of the present study forbid. Moreover, such interpretation is best carried out by one familiar with the clinical materials on aphasia. The layman can do little more than offer a suggestion and point to a significant group of kindred facts.

VIII. The unstable character and the *variability* of the factors operative in the early phases of *nominal integration* are very conspicuous. This feature is well illustrated by the careful record, kept by Idelberger, of all cases of the use of a child's first definitely established vocables. I will quote the record of the first three words given in the list, " waw-waw ", " a-a ", and " ch-ch-ch ". The uses here are typical of the shifting nominal relationships apparent in the whole list.[1]

Age in days.	
	1. *Waw-waw.*
251	Kurt said *waw-waw,* in the first observed case, on being carried into the parlour where there was a porcelain dog. (No vocal pattern set at that time by any adult.)
257	The same.
302	While looking at a picture of a sewing-table in a magazine, Kurt said, in great excitement, *waw-waw.*
307	Hearing barking of dog outside.
	Looking at hobby-horse.

[1] Idelberger, H., " Hauptprobleme der Kinderlichen Sprachentwicklung," *Zsch. f. päd. Ps.*, Vol. 5.

Age in days.	
307	Looking at picture of grandfather. Looking at wall-clock.
314	Applied to porcelain dog, again.
324	Same.
331	Applied to fur neck-piece with ornamental dog-head. Applied to another fur neck-piece without ornament.
334	Applied to squeaking rubber doll.
337	Applied to cloak-buttons.
341	Applied to cravat.
398–428	Commonly applied to either buttons or dogs. Kurt frequently calls *waw-waw* when he sees a dog in the street. At night he says *waw-waw* and *ss-ss* (cat) and crawls to the window overlooking the court where the dog and cat are frequently seen. It is also used as a call for cloth dog to play with. Even after this, however, it was sometimes applied apparently quite irregularly, as to the bath-thermometer.
	2. *A-a.*
258	Kurt, brought to see his father, played with his hair and babbled *a-a.*
260	When looking at objects such as carriages, horses, dogs, birds, etc., Kurt commonly says *a-a.*
372	Having urinated on the floor, Kurt, pointing, said *a-a.* Also spoken when milk is spilt on floor by mother.
373	Says *a-a* when he needs to urinate.
375	Applied to drops of milk fallen on the floor.
376	Applied to little chamber on the floor. Holding up his soiled hands after eating, he says *a-a.* Hereafter applied generally to things out of order and soiled.
	3. *Ch-ch-ch.*
259	His mother touching hot stove said, " Heiss, heiss ". Kurt laughed and said *ch-ch-ch.*
289	Frequently used when pointing to bright lights.
290	Kurt reached for a fly on a wall. It flew away. Kurt laughed and said *ch.*
322	Kurt greeted the Christmas tree with glee, crying *ch-ch-ch.*
323	The same.
360	Has passed out of use.

Although specific vocal reactions tend to become integrated with other specific activities it must be remembered that these acts are already involved in the

phonetic habits of vocal play. There is no sudden transition in the child's habits from lallen and real verbal activity. Acts which the adult considers as " words " are in the child's habits merely bits of babble that have taken on new relations. In the talk of a child in the first half of the second year it is impossible to discover absolutely which sounds are " words " and which sounds are mere lallen, in fact, the distinction at this stage is wholly arbitrary.

The same fact, namely, the absence of any sharp transition in behaviour between vocal play and the use of words—the free interaction of phonetic, intellectual, emotional and overt muscular habits at this stage of infant behaviour—is further illustrated by a record of verbal activity of an active two-year-old child. I made one such stenographic record, for fifteen minutes, of the vocal activity of Diane (with the co-operation of her mother) at the age of twenty-one months. It runs as follows, the dashes being used to indicate sounds which were not recognized either by the mother or by me as having any definite meaning at all:

Record of vocal activity of Diane during fifteen minutes.

February 1, 1926.

(Mother: " Where–is the basket ? " pointing to a basket on the floor).
There–is ! (Fetching the basket).
gi-gong ! (ding-dong, hearing the university chimes from across the Campus).
– – – – – – – – – (whispered).

– car (spoken loud) (seizing toy-car).
– – – (Playing with car) (whispered).
– – – –
–
there ! (having climbed up in chair).
– –
there ! (down on the floor again, running about).
– – – –
– – – – (a sort of artificial cough, repeated several times).
moo, moo ! (Cow) (looking at picture-book).

there ! (getting into comfortable position in chair).
kikky ! (chicken) (several chickens in the picture).
kikky !
kikky !
There-a kikky.
kikky – –
ar ar (Fragment of crowing as made by mother on previous occasions in this connection).
– –
– – – book (reaching into case for book).
– – – – –
– – – – – (spoken loud).
Tan-y ! (Stanley. Name of little boy in the same house. Spoken on hearing noise of walking in hall).
wow-wow wow wow (reaching for toy-dog).
– – – – – – (whispered).
– –
wow – – wow-wow – – (all this spoken, while holding toy-dog high in the air).
– –
– – – – (whispered).
– –
up ! (request to be taken into mother's lap).
– – – – – – – – (spoken loud).
– – –
kikky (picking up picture-book again).
– –
– – bok (scrambling after box of blocks).
– – bok.
da bok.
cover (picking up a white sweater from the chair).
– – (carrying it over to her mother, and putting it on her like a blanket).
cold (This was uncertain. Spoken as she put " cover " on mother).
dow ! (down) Climbing down from her mother's lap.
– – – – – – (spoken as she chased after a rolling wooden bead).
bead !
– –
(Mother : " Want to string another bead ? ")
na na na (no).
there ! (pushing her finger against a tin box).
cookie (some little cookie crumbs in the box).
(Mother : " Yes, it's a cookie.") (Meanwhile Diane holds box to her face. An expression of pleased surprise follows taste of crumbs, but she says nothing).
– – – – – (chasing beads again).

The meaningful words were more apt to be spoken loudly and distinctly, but this was not at all an invariable rule. A total of one hundred and seventeen syllables were recorded, of which eighty-seven were meaningless even to the mother. The total thirty syllables recognized as " words " by the mother, including repetitions, comprised seventeen different words, with several partially expressed significant combinations of words. In six different " phrases ", words appeared in the midst of strings of apparently nonsense syllables.

One of the immediate conclusions to be drawn from this study of the growth of verbal activity in the life of the child is the artificiality of making any rigid distinction between the affective and the referential relationships of words. Symbolic structure is a *gradually differentiated* structure *within* the total physiological and social context of linguistic activity. This is, of course, no disparagement of the normative value of insisting upon the differentiation of strict symbolic reference from vague fancy and emotive connotation. It is simply a protest against the assumption of such a division as pointing to factors originally isolated in the rise of symbolic activity or as involving an absolute metaphysical distinction. It is no disparagement of exact science to recognize that it is necessarily an artificial instrument, fashioned out of the raw material of haphazard responses and having varying degrees of applicability to various phases of the life of man. This recognition is wholly consonant with the doctrine that exact science is the fundamental instrument of civilization and " the good life ".

Early verbal activity is largely controlled by elementary reaction tendencies and emotional organization. Accordingly, verbal activity is, for a long time, largely representative of visceral excitations, shifts in intentional patterns and accidental associations, illustrated by such childish " sentences " as " auto-bow-wow-bow-wow-moon-pretty-moon ", spoken apart from any significant context whatever. Verbal activity tends to be highly affective and

" subjective ". This is a feature of the glory of words. Otherwise they would be poor instruments for the formulation of purposes or the affectionate communion of comrades. But wholly undisciplined verbal activity is ineffective because its symbols are, to such an extent, *merely* expressions of mood, without precise meanings or definite relations. One swear-word or one love-word is as good as another except in so far as it carries definite connotations.

The recognition of the affective character of the child's first symbolic activity is voiced in Meumann's description of the first words: " The first word-meanings of the child are entirely of emotional or volitional character. They do not refer to objects or events, but only to feelings and wants, or if they do incidentally refer to objects, this reference is merely a subordinate one, and the words really point to the emotional or volitional import of the object to the child. Only through a process which I will briefly call the *intellectualizing* of the first words, do word-meanings become of an objective character (designative of things or events) while, however, the words retain their emotional aspect." [1] This is, however, an over-statement. It involves an unwarranted isolation of emotion and intellect. On the contrary, it is only by what Meumann calls " intellectual reference " and what is here called " specific conditioning " that lallen becomes established as speech at all. The relation of vocal patterns to actual situations and social and personal behaviour constitutes a factor which is continuously operative from the dawn of nominal integration to the end of life.

It is clear, however, to all friends of children that they find a great delight in sheer talk, as talk, and significance is often a relatively secondary matter, except when some definite need is felt, or some definite objective situation demands definite participation *of child and adult in conjoint activity*. The joy of babble is heightened by the sense

[1] Meumann, E., " Die Entstehung der ersten Wortbedeutungen beim Kinde," *Philosophische Studien*, Vol. 20, p. 156.

of audience, but the audience is not essential. The discovery of new verbal combinations is a joy in itself. Children, accordingly, engage in word plays, combinations of sounds, questions, and at a later age, secret languages. At a later stage *slang* expresses gusto, interest, joy, disgust and humour rather than exact intellectual references. It has, further, the emotional significance of enabling the boy to emphasize his identity with the gang of " regular fellows " rather than with the pedantic community.

The prevalence of a primitive poetry in children is a conspicuous characteristic. The crude art of infant lallen is refined into an intelligible art of poignant expression.

Trettien quotes the following composition of his little four and a half year old child, sung on a rainy morning, when outdoor play was impossible, and resort to other resources and another type of play was called for.[1]

" All the trees are shining
And the morning is sitting on the sky,
And the dew is coming, is coming,
And the rain is falling
When the sun is gone."

The exquisite imaginations of another poet of the same age have, fortunately, become well known. The following verses are among those sung by Hilda Conkling before the age of five[2]:

" The garden is full of flowers
All dancing round and round.
John-flowers,
Mary-flowers,
Polly-flowers,
Cauli-flowers,
They dance round and round
And they bow down and down
To a black-eyed daisy.
. . . . . .
I will sing you a song,
Sweets-of-my-heart,
With love in it,

[1] Trettien, " The Language Interest in Children," *Ped. Sem.*, Vol. 11, pp. 113-77.

[2] *Poems of a Little Girl* (Hilda Conkling).

(How I love you !)
And a rose to swing in the wind,
The wind that swings roses ! "

An analogous but more raucous pleasure in talking is reported by Trettien : " With a disregard of verisimilitude and concentration on strong effect, the boy would pile up the agony in a story, relating, for example, how the dog killed a bunny, had bitten off his head, was then drowned, and so on through a whole Iliad of canine calamity." [1]

My daughter's poetic productions at four and a half usually run in the less elegant mood of the last example. Although normally quite a rational little body when " the divine afflatus " is upon her she chants in a high voice, with great satisfaction, such incoherent " new little songs " as the following :

" The pieman met a blossom
And threw it down the stairs ;
He took a piece of glass
And tried to cut himself,
And cut himself in two
And scratched out both his eyes."

Sometimes, however, she offers " pretty songs " :

" Go to sleep, my little baby
Mother sings to you
You are sitting on a twig
Looking at the stars
And they do not move."

" Once there was a little baby
And her name was Mumsie
And she did not have a house
But lived in a tree
And she did not know how to cook
And some people came along
And they chopped down the tree
And they found a very hungry baby crying.
. . . . . .
Now let us clap our hands for this song."

In mature life, poetry ceases to be mere uncontrolled affective association and primitive rhythm and becomes

[1] Sully, quoted by Trettien, *op. cit.*, p. 146.

charged and controlled by reflective inquiry and canons of technique. Similarly, the systematic organization of symbolic structure, as an instrument of physical, social, and personal control, is gradually effected in the individual's life, in rapport with the traditional science of his cultural environment. Thus differentiated, but held in mutual tension, science and art become the twin modes of human excellence.

IX. The development of silent speech, or silent discursive thought, obviously makes possible greater convenience of verbal adjustment. It enables an individual to carry out a series of private verbal adjustments without attracting attention or disturbing other people. The growth of silent verbalization is a gradual development. It is no more mysterious than the growth of overt verbal activity and involves, at least essentially, no different relationships. Whether one happens to talk out loud in his sleep or whether he dreams silently does not affect the quality of consciousness. Likewise, whether one thinks out loud or whether one thinks silently does not essentially affect the quality of the thinking, although the former may involve awkward social effects.

The question as to whether or not delicate movements or tensions of the throat and mouth organs are involved in all silent verbal behaviour is a technical question upon which the evidence at present is uncertain. It is not, however, a question of any great philosophical moment. The discovery of kinesthetic innervations from muscular tensions, as, for example, in the hypoglossus nerve,[1] one of the four principal nerves of the tongue, suggests the possibility that such innervations may be an essential link in verbal processes even when no audible sound is produced. A careful instrumental study of tongue movements during implicit verbal activity indicated the presence of slight movements of the tongue when words were silently thought immediately after they had been spoken

[1] Langworthy, "Problems of Tongue Innervation," *J. Hopkins Hosp. Bull.*, Vol. 35, p. 239.

out loud, and indicated variations between individuals, in the extent of tongue movements during verbal thought; but it also indicated in some cases the complete absence of any tongue movements during silent verbal thought, at least so far as delicate instrumental procedure could record.[1]

Of course, many people find movements of the lips and even talking out loud to be an aid in reading and thinking. "Talking to oneself" is common among people who are forced to be alone a great deal and have nothing to conceal. It is probable that only social pressure restrains us from the more natural process of normally thinking out loud. In any case, verbal activity in the advance of years does become more and more independent of overt muscular adjustments and even of minute muscular tensions. The fact that neither the surgical removal of the larynx, nor the removal of the tongue (Blair's operation) produces aphasia in thinking would seem to indicate that the cortical processes involved in verbal thought may become at least potentially independent of muscular adjustments.

Also, it is impossible to define, at present, the exact extent to which silent verbal processes may be slurred over in mature reflective thinking. Unquestionably, minute verbal processes are focal in most adult human thought. However, just as hints of visual patterns become sufficient to carry complete meanings in rapid reading, and just as hints of auditory patterns function in similar fashion in conversation, so it seems probable that very much abridged processes of silent verbalization may carry thought forward, in mature thinkers, to new hints of verbalization and new overt reactions, in relation to sensory imagination and emotional activity. It is probable that the verbal forms afford a structure which is ordinarily slurred over and syncopated in mature reflection.

It is not known at present at just what age the normal

[1] Thorson, Agnes M., "The Relation of Tongue Movements to Internal Speech," *J. of Exp. Ps.*, Vol. 8, pp. 1-32.

child becomes able to carry out silent trains of verbal activity, *i.e.*, silent discursive thinking. In fact, there are almost no references to the subject in the literature of child psychology, so far as I know. Piaget puts this age at seven, but without citing any specific evidence: "Apart from thinking by images or autistic symbols which cannot be communicated, the child up to an age as yet undetermined but probably somewhere about seven is incapable of keeping to himself the thoughts which enter his mind. He says everything, He has no verbal continence." [1]

Incidents which occurred in my daughter's activity near the end of her fifth year seemed to me to give definite evidence of a capacity for such silent formulation of verbal processes. One such incident, when Joyce was four years and eleven months old (with an estimated mental age of six years and one month),[2] is reported in another connection in Chapter V. It revealed an ability to formulate her answer to a guessing game without audible whispers and while she continued to chew her food at breakfast, to recognize that she had her answer, and then to announce it suddenly and triumphantly. I found no such evidences a few months earlier. The following incident, at four years and eight months, seems to indicate an incapacity for silent verbal processes at that age:

Joyce: I'll give you my soap, daddy, and you can wash your hands while I wash mine. I have another cake for myself. – – – Why did I give you my pretty soap?
F. L.: I don't know. Why did you?
Joyce: You guess!
F. L.: Because you saw my hands were dirty?
Joyce: No.
F. L.: Well, why did you?
Joyce: You guess.
F. L.: Because you wanted to see me wash?
Joyce: No. You guess (with rising excitement).

[1] Piaget, Jean, *The Language and Thought of the Child*, p. 38.

[2] Estimate based on score on Kuhlman-Binet tests given five months earlier, assuming constant intelligence quotient.

F. L.: Because I told you stories to-night ?
Joyce: No.
F. L.: Because I tossed you on the bed ?
Joyce: No.
F. L.: Because you want to be kind to people ?
Joyce: No.
F. L.: Well then, now you tell me. I have guessed five times, and you must tell me now.
Joyce (She knitted her forehead; seemed to be making a strained effort to think; then said): Now I can't think myself! Wait, let me think! (More expression of strained concentration; then she said *in whispers to herself*): Be kind to people . . . kind . . . to daddy. (Here her face lighted up): Now you guess!
F. L.: Because I told you stories ?
Joyce (Jubilantly): No!
F. L.: Because you wanted to be kind to daddy ?
Joyce (With enthusiasm): Yes . . . wait . . . let me see. (Again in audible whispers to herself): Because I love my daddy. (Then out loud): Now you guess, daddy!
F. L.: Because you thought I would like the pink soap ?
Joyce: No.
F. L.: Because you love your daddy ?
Joyce: Yes![1]

On the basis of such incidents, I estimate that Joyce was not able to carry out trains of silent verbal processes (without audible whispers) at four years and eight months of age, but that she acquired this ability in the course of the next three or four months; and that after the age of five Joyce was able to keep definite secrets which had been formulated, or to exercise "verbal continence" if she wanted to.

Sounds can only become "words" by virtue of a social process. Therefore, whatever social or intellectual efficacy phonetic patterns have acquired in the life of the pre-school child has its origin in the operation of social forces. It is, nevertheless, true that the pre-school child's implicit intellectual processes and phonetic activity (which at this period are only loosely integrated) are both largely autistic, as Piaget has emphasized, and only gradually become socialized, systematic and rational.

[1] Record of conversation made on the same day.

Verbal processes (spoken or silent) supply the dominant systems of all typically human intellectual life. This involves (1) the establishment of fixed "symbolic relations" between unitary phonetic patterns and patterns of situation and behaviour (which are lacking in the fluctual relations of the "first words"), so that words may function as *foci* of or *substitutes* for organic patterns in the processes of intellectual experimentation; (2) the development of fixed *relations of order* and sequence in the verbal processes themselves (systems of reference and inference in systematic thinking); and (3) the capacity for more and more intricate *correlation* of intellectual processes, including explicit symbolic systems. These factors in the growth of reason develop simultaneously and are mutually dependent. Their development is gradual, beginning with the very dawn of verbal activity and reaching far into adult life (so long as wisdom grows). The study of these three factors will be the theme of the next three chapters.

CHAPTER III

SYMBOLISM AND MEANING

IN entering upon the discussion of symbolism and meaning we are, as those who have followed recent philosophical and psychological literature are aware, headed straight for a fog-bank. However, there are some currents and landmarks to guide us, and perhaps we may be able to find more consistency in the winds of doctrine than at first appears. Before attempting to determine the true course of the doctrines, it will be best for us to continue empirical exploration, or at least to summarize the data already ascertained.

I. *Words*, we have found, are integral members of two different systems of relationship. They have *two* contexts: *the hereditary and acquired structure of the individual organism* and *the physical and social environment.* Each of these two contexts has a more or less independent structure and organization. At the same time, it is obvious that any individual organism is in origin and in the whole course of its development functionally dependent on its physical and social environment. Also, the structure of the physical and social environment of any individual is in varying degrees dependent upon the hereditary structure and growth of individuals of the same species. Contemporary human life is conditioned by such "environmental" factors as sunshine, rain, gardens, houses, haircuts, radio, grand opera and sonnets, and these "environmental" factors are functionally dependent upon the physiology and intellectual life of human persons in varying degrees from zero to infinity. In short, vocal events, like other "overt" physiological events, are involved in

two contexts, the organic and the social-environmental, which are in part *in*-dependent and in part *inter*-dependent. But vocal events gradually become, *in a degree to which no other physiological process is at all comparable,* the medium of interaction between individual organisms and the social environment: the means whereby society controls, " humanizes ", and educates the individual, and the means whereby the individual reorganizes his social environment.

One suggestion toward the clarification of the doctrines of symbolism and meaning can be given at the start: some theorists have their eyes primarily on the social context of words and gestures and their consequent functions in human life; other theorists are primarily concerned with the psychological context of events in intellectual processes. Few theorists have taken adequate account of the interaction of these two sets of processes. The clarification of the conceptions of symbolism and meaning depends upon an unravelling of the main lines of interaction between the structure of organic intelligence and the structure of social organization and an adequate recognition of the rôle of vocal processes in this interaction.

II. Organic activity has, as discussed in the first chapter, a very intricate structure before the beginning of verbal activity. *The life of higher animals is characterized by capacity for intricate neurological correlation of implicit behaviour processes.* The patterns of these implicit processes as internal *reactions* are " representative " of primary physiological and environmental patterns; and as internal *stimuli* they are " instrumental " to sequential overt physiological adjustments and environmental changes. The tensional correlation of these implicit processes constitutes what has been called " organic intelligence ", or " intuitive intelligence ". The degree of intellectuality is determined by the internal complexity of the unitary patterns in such implicit experimentation and the number and complexity of the connections between

them. In other words, excellence of intuitive intelligence is a matter of the degree of "the span of intellectual correlation", the capacity for the simultaneous correlation of intricate implicit processes.

III. Social organization is also prior to verbal activity. *The behaviour of higher animals is controlled by "social ways" to a high degree*—far more than was recognized a generation ago.[1] For example, although bird migrations are still a subject involving a great deal of mystery it is now well established that their explanation must be worked out in terms of traditional "bird-ways" and social control. And apparently birds are quite as conservative as human beings are, preserving traditional courses which have historic explanations but no present value. For example, I understand that some swallows who nest as far west as Colorado always migrate via the Delaware Valley, spreading out again during the winter as far west as Texas. Their ancestors became prosperous, following up and down the eastern cultivated farm-land tract, then spreading out west as the farm-lands spread out. So when migration time comes the present swallows fly in the ways of their forbears; and any radicals who seek new ways usually get lost and perish.

The reports of experiments and accurate observations on pigeons by Whitman, Craig and others reveal a hitherto unrecognized wealth of customs and social influences among these birds, involving vocal activity as an important means of social control.

"The parents make no conscious efforts to educate the young. Nevertheless they educate them unconsciously in some very important matters. For example, the parents exhibit to the young the body-form, colours, gestures, and sounds characteristic of the species and thus the young learn to recognize their kind. Professor Whitman has proved this again and again by taking the eggs or young of wild species and giving them to the domestic ring-dove to foster, with the result that the young reared by the

[1] The operation of such social *Gestalten* is well set forth by Wheeler. See his *Emergent Evolution* (1927).

ring-doves have ever after associated with ring-doves and tried to mate with them. Passenger pigeons, for example, when reared by ring-doves, refuse to mate with their own species but mate with the species of the foster-parents. Hence we must believe that young doves have no inherited tendency to mate with birds of a particular kind; they learn to associate with a particular kind during the period when they are being fed, when the characteristics of their nursing-parents are vividly impressed upon their young minds. The young doves have impressed upon their minds not only the characteristic marks of the species, but also the fact of differences between individuals. At first the two young doves (since there are nearly always two in each brood) are prone to beg food from each other as well as from the parents; but the facts that the nest-mate does not give food and that the parent does give food gradually lead the young dove to distinguish between the nest-mate and the parent. As the time of weaning draws near, the mother becomes unwilling to feed long before the father does so, and usually ceases to feed long before he ceases; this difference of behaviour leads the young to distinguish between the two parents, and thus to add to their knowledge of individuality. Strange birds of the species may come near the young ones; the young may at first beg from these strangers, but the strange birds (under ordinary circumstances) refuse to feed them, and may even drive them off with blows; the young doves are thus familiarized with a further distinction of individuals. Thus a young bird which at first makes the most ludicrous blunders due to the confusion of individuals, gradually learns to make more numerous and finer distinctions until at length its perception of individual differences among doves is more delicate and more certain than can be attained by a human being. And it recognizes individuals not only by appearance, but also by voice.

Anyone who has witnessed the mutual influence of the sexes in doves, and has appreciated the power of that influence and the profundity of its effects, can never again hold the theory that the voice of the dove is impotent and useless. This reciprocal stimulation of the mating period has not only the immediate effect of rousing the mutual feelings of the two birds and uniting them to one another by an unbreakable bond. It has remote effects of great diversity and vast import, some of which I shall now indicate. The union of a certain male with a certain female inhibits each of them from paying attention to the sexual advances of other individuals. The two birds are remarkably faithful to one another so long as they remain mated. This faithfulness is not blind and inevitable, like the reputed faithfulness of an ant

or a termite. For it may be terminated by the death of one party to the union, or by the passing of the breeding-season, or by other circumstances. In such cases the liberated bird or birds may afterwards form new unions. This fact shows that so long as the two birds do remain united and faithful, they must be controlled by bonds which are potent not only to bind them to one another but also to make them regard with indifference the sexual behaviour of their neighbours. One such bond is a daily and almost hourly communication of affection by means of voice, gesture, and mutual caresses. . . .

There is a great deal of contention among pigeons. But a contest is never decided by mere physical strength and prowess. Very rarely does a bird suffer serious injury in a fight. The vanquished is usually defeated simply because of the superior determination of the victor. Hostilities are accompanied or preceded by an elaborate ceremony of cooing and gesturing, and in a large proportion of cases this pantomime alone is sufficient to show which party to the quarrel is most determined, and to cause the other party to turn tail and flee without striking a blow."[1]

The apes described by Köhler certainly have quite elaborate " ape-ways " into which a new-comer is gradually acculturated, including among other patterns ways of using available instruments for reaching and climbing, a sort of rhythmic play or dance, and types of murmurs, wails and rejoicings. According to the available scanty and uncertain information, the behaviour of the African great apes, gorillas and chimpanzees, in their native environment seems to agree in general with that of the chimpanzees in captivity, as described by Köhler, although the East Indian orang-utans seem to be a more solitary lot.[2]

It is not surprising that still more intelligent animals, under such environmental conditions as have been suggestively sketched by de Laguna,[3] should have developed much more definite and elaborate " animal-ways ",

[1] Craig, Wallace, " The Voice of Pigeons regarded as a means of Social Control," 1908. *Am. J. of Soc.*, Vol. 14, pp. 89-98 (refers to Whitman).

[2] Forbes, *A Hand-book to the Primates*, Vol. II.

[3] de Laguna, *Speech*.

including techniques of tool use and specific mechanisms of vocal social control, which gradually developed into the " folk-ways " described by the modern anthropologist. It would, however, be a great mistake to minimize the difference between animal societies and human society. Among the most versatile infra-human animals, such as the anthropoid apes, social relations constitute a relatively superficial phase of the total vital processes—whereas to be " human " is essentially a social process, although it involves specific physiological equipment.

IV. Vocal acts are originally involved in the intellectual correlation of behaviour just as other physiological processes are. During the whole course of meaningless vocal chatter, vocal processes gradually accumulate intensity and dominance in behaviour. Prior to all specific " nominal integration " they are already in a general way the keys to social attention and a variety of fascinating experiences. Gradually, by virtue of participation in definite recurrent types of social processes, specific vocables become dominant *foci* of fixed reactions to various situations and the instruments of specific social adjustments. Thus, *originally, words are built up in relation to traditional types of social behaviour, and, in turn, more specific and intricate types of social behaviour are built up in relation to words.* Historically the two processes were interactive in their evolution. To-day, of course, the elaborate ways of civilized life, organized around words, exist ready-made, and operate to stamp patterns into infant life in relation to specific vocables. The gradual differentiation and extension of the social functions of vocal activity, among a race of animals characterized by increasingly complex nervous systems, is the fundamental principle of the historic trend of *vocal* activity toward *verbal* activity, and the emergence of language.

There was no time when communication can strictly be said to have " begun " ; any more than there is a time when a baby uses his " first word ". And once established

as an important mode of social control and of mental life, words become both the trellis and the tendrils of human culture; they are the support of civilization, and they undergo constant revision and refinement in ever new fields of experience.

It is interesting to speculate, however, on the beginnings of articulate "societies" of human "persons". It is certain that as a race we have been boasting, laughing, complaining and planning together for *over fifty thousand* years, *i.e.*, before and through the period of the last great glacial advance—and probably *much longer*. The use of fire preceded the extensive use of caves as shelters. Charred embers are found in the earliest shelters of the Neanderthal race.[1] The caves were dark and damp—also they were commonly bear-dens. They would have been miserable and dangerous places without fire. In fact, concern for the preservation of fire was very possibly a prime motive in the use of caves. Fire, once "tamed", became a supreme possession and an object of great solicitude—for primitive groups certainly used fire before they had sure and skilful means of kindling it. Incidentally the "ignean revolution" entailed a new differentiation of labour along sex lines. A new task ("Keep the home fires burning!") now fell to nursing mothers when ancient hunters went far afield. And Neanderthal women fulfilled this task through many long glacial winters before the coming of their successors, the brilliant, artistic and undoubtedly eloquent Cro-magnon people. It is very possible that crude stone cultures before the use of fire involved a considerable degree of articulate communication and social organization. But, at any rate, it is safe to assert that the use of language must have been essential to the social co-operation involved in the "taming" and preservation of fire; and it is inconceivable that comrades of the

[1] According to Osborn, *Men of the Old Stone Age*, 3rd Edition, p. 165, "The first positive evidences of the use of fire are the layers of charred wood and bones frequently found in the industrial deposits of early Acheulean times"—dated 150,000 years ago. (*Ibid.*, p. 108.)

hearth lived with locked up minds. Here, certainly, it is possible to point to a society of persons who had achieved the essential foundations of human culture: definite patterns of social organization, homes, language and art.

In the growth of verbal activity in the individual child to-day innumerable fixed patterns are operative, which exist ready-made in the surrounding society and which serve to fix more and more exact nominal relations and significant order and sequences between words. In the child's life words and logical structures are built up in a few years which required vast eras for their original differentiation and construction. In both processes, however, there is the same fundamental relationship between language processes and patterns of social activity: words are gradually fixed by the operation of social patterns, as they become more and more definite through accumulation in primitive behaviour or as they exist ready-made in civilized society—and in either case, the verbal processes contribute to the further definition and elaboration of modes of social activity.

V. Physiologically, the vocal innervation-pattern becomes the *innervation focus* of a unified, intricate behaviour pattern. The word gradually becomes the focus of, or the substitute for, more intricate patterns in the processes of cerebral correlation.

Functionally, the word becomes the *tag*, or *handle*, of a whole behaviour complex in social and personal adjustments.

The contribution of a *single word* to the organization of social and mental life may be illustrated by any concrete instance. For example, the word *bye-bye* may first become fixed in the child's habit life by virtue of the frequent recurrence in some very limited sort of situation, such as baby-being-held-up, hand-waved, bye-bye-spoken, and friend-going-away. Nevertheless, for the child it will probably have at first quite vague and shifting application.[1] But the word bye-bye has its definite set of rela-

[1] See Chapter II, Section VIII, above.

tions in the usage of the mother and the customs of the community. Therefore, gradually through the instrumentality of the word, a generalized and at the same time an *exact* " bye-bye " situation-pattern is fixed in the child's habits. Later this type situation may be refined in specific varieties: " bye-bye daddy ", " let's go bye-bye ", and " bye-bye milk ". And the last phrase may be used alternately with " milk all gone ", thus laying a basis for interpretation. By such enlargements and refinements of meaning, translations, and the addition of new concepts freshly cut out of previously undefined experience, conceptual experience is constantly enlarged and revised.

As they gradually become established with more and more definite relations in the child's mind, *words become central in the organization of memories and the anticipations of future events.* At one year and eight months, Diane (referred to above) began to repeat strings of words as she lay in bed in the morning, such as " Bunny an' mummy an' cookie an' buttie (butter) ", and so forth. It would be impossible, of course, to know what " sensory fringe " may have surrounded these vocal acts; but they frequently had observable difference from the babble accompanying play at the same age, in that they were more distinct and isolated in their enactment. The following rhapsody was taken by a stenographer in the adjoining room, as little Hilde Stern lay in bed, at two years and eight months (one year older than the child in the previous instance). It illustrates clearly the operation of words in memory processes, as affording a definiteness in imagination which would otherwise probably be impossible. " Pretty —the moon shines—pretty, cold moon—yes—watch the moon—mamma come too—go in car, travel Breslau, yes ?—first the aunts come in, child comes in, too—gives hand, great-aunt, yes, yes Hilde comes too—morning first go stores—buy things, buy butter—Hilde runs all alone, bring pretty cloth home, so—three pretty soldiers, rumtumtumtum—the red soldiers have the rututu—then we go away, aunts come again—doll carriage buy, will

buy a pretty doll carriage." [1] Thus concepts, once established in relation to other organic habits, come to be constantly reorganized in processes of memory and imagination, as well as in relation to external situations and overt adjustments.

The way in which a word may serve to fix an intention and so function in the control of conduct is illustrated by the following conduct which I observed in Sonya, at the age of sixteen months. Sonya was sitting in her high chair and had finished her supper. Suddenly she said "ball!" although no ball was in sight. Although the visual pattern of the ball as a desirable object *might* have flashed into her mind without the aid of the verbal act, this is by no means certain; and in any case the operation of verbal activity probably intensified and facilitated the revival of any visual imagery which may have occurred. Her father then let her down from the high chair, and she went to the sideboard under which the ball was apt to roll, got down on hands and knees, and looked there for it. It was not there. Then she got up and looked under the couch in the same way, found the ball, and got it out. Throughout this whole process she kept repeating "ball—ball—ball". Anyone who is familiar with the difficulty which a child of this age has in fixing attention on an absent thing for several minutes can readily recognize the way in which the verbal act served to define and fix the intention. Similarly, of course, more intricate patterns of intention become fixed in relation to established symbols as the purposes and ideals of mature life.

VI. It may be said that the child has "ideas" before he learns how to use words but that he only achieves "clear and distinct ideas" through the instrumentality of socially established symbols, such as words. The difference is fairly well indicated in the traditional distinction between "percept" and "concept". The term *concept* may be given a definite meaning by defining it as an

[1] Stern, *Kindersprache*, p. 61.

implicit behaviour pattern focused in a word or other socially established symbol. The organic contexts of such a word may then be said to constitute one set of so-called " meanings ", and the social contexts of the word may be said to constitute another set. Similarly, a *symbolized intention* may be labelled a *purpose* and (if socially reinforced) an *ideal,* in contrast to the fluctual intentions and " wishes " of unverbalized personality-organization.

In pre-verbal thinking, or purely intuitive experience, synthesis and analysis are inextricable. In the organization of any response some elements must be included (*synthesis*) and other elements excluded, but the excluded elements continue to be more or less functional as an organic context or " ground " against which the newly organized pattern emerges as distinct (*perceptual analysis*). When, by virtue of linguistic accomplishment, the new unit of experience is, so to speak, tied up into a bundle and labelled with a *name* or other device for social reference we have what may be called *conceptual analysis*; although it involves intellectual synthesis as well as analysis.

The verbal organization of experience provides a structural isolation of the analytic and the synthetic processes. A concept may be treated *as a whole* and subjected to the further conceptual analysis of some of its factors, as when the child learns to say, " kitty soft ". This, as will be pointed out, is the basis of the differentiation of " qualities " from " substances ". On the other hand, a concept may be treated *as a unit* and included as one factor in a complex symbolic construction, as when the child says, " Brother go school ", or a logician says, " Class A has the relation R to class B ". In other words, socially fixed " terms " function as the instruments of explicit analysis and construction. A *term* functions as a *terminus ad quem* of some (previous) intellectual processes and a *terminus a quo* of others. The " terminated " synthesis has social status; it is " there ", ready to be used in further operations, either in the analysis of its attributes,

or in constructing larger composite wholes, or in looser elaborations and associations which lie between these two logical extremes. Ideas which have not been so " terminated " cannot be treated in the same fashion; they are slippery. Concepts, in contrast to intuitions, are the instruments of skilled thinking.

VII. At the beginning of this chapter the suggestion was offered that some of the authors who discuss symbolism are absorbed in consideration of the structure of mental activity, whereas others are concerned with linguistic structure and the social function of words, but that both groups usually fail to give adequate attention to the functional interaction of the two sets of processes, the social and the organic contexts of words.

The term *symbol* is frequently applied to any element in experience which is treated as distinct and yet at the same time recognized as functionally related to another element or elements. Whitehead uses the term in this way: " The human mind is functioning symbolically when some components of its experience elicit consciousness, beliefs, emotions, and usages, respecting other components of its experience. The former set of components are the ' symbols ', and the latter set constitute the ' meaning ' of the symbols. The organic functioning whereby there is transition from the symbol to the meaning will be called ' symbolic reference ' ".[1]

On the other hand, linguists and some psychologists and philosophers use the word *symbol* consistently to designate terms which are socially or institutionally established. This usage has, I think, the best traditional authority. At least it has the support of Aristotle. " Symbola " in common Greek usage clearly had a social and institutional significance, referring to the two halves of a broken stick or coin which were kept as tokens of a contract. Thus the word came to mean an item, such as a word, employed as an instrument of communication. Aristotle was familiar

[1] Whitehead, *Symbolism: its Meaning and Effect*, p. 8.

with the psychological-logical distinction which Whitehead has in mind, but he has used another term for this, " semeion ", which is commonly translated " sign ". This distinction between " sign " and " symbol ", the latter reserved for items in communication, is preserved by the most careful modern scholars who are aware of all the difficulties involved. It is followed, for example, in the definitions of sign and symbol by Peirce and Baldwin in the *Dictionary of Philosophy and Psychology*, and by Ogden and Richards in *The Meaning of Meaning*.

Freudian psychologists have added further confusion by adopting the term symbol to designate patterns which have become unconsciously substituted for overt objects of emotional interest. Thus, by one of the ironies of language, the term symbol has come to be commonly applied in certain circles to just those items of experience whose relationships are by definition socially unrecognized and incapable of verbal statement. Psychoanalysis is primarily a technique for bringing these relationships into conscious, social adjustment. The physician helps the patient to *symbolize* (in the classical sense of the word) phases of life which have been pathologically isolated and suppressed (the objects of these abnormal interests being called " symbols " by the Freudians).

VIII. The confusion in the use of the term symbol, contributory to the confusion of thought, is a reflection of the lack of adequate theory regarding the relation of elements in linguistic communication and social organization to elements in the thought life of the individual.

According to the more usual theory in modern philosophy, linguistic structure is regarded as merely " expressing " logical structure—which is conceived as something wholly *a priori* to linguistic forms. This position is stated with clarity and vigour in Buchanan's recent treatise on *Possibility*, as follows: " I am assuming that linguistic elements, as they are called, taken materially, are related to logical or intellectual forms as values are related to

variables. They hold a status like any particular which may satisfy a propositional form. If such forms are universal, then words, gestures, notations, images, which may have æsthetic or natural characteristics as well, in so far as they are the adequate expressions of intellectual form, are instances of them. In other words the relation is logical, not naturalistic." [1]

Now, in part, this assumption is sound—because all intellectual evolution is grounded in organismic structure (which may be conceived as a focus and reorganization of various structures of natural existence), which is prior in its organization to the emergence of linguistic activity. But, in part, the assumption is quite fallacious because of the artificial dichotomy between logical and naturalistic relationships, the failure to recognize the social factor in the organization of logical structure, or that linguistic processes are continuous with the other organic and environmental processes, which together constitute in their more stabilized interactions, the structural constitution of human intellectual life, the "forms of human experience".

The contrasting position has been most effectively stated by Dewey. The discussion in *Experience and Nature* may be said to dispose finally of the conception that speech consists of "mere words that happen to be associated with perceptions, sentiments and thoughts which are complete prior to language", and according to which "language 'expresses' thought as a pipe conducts water, and with even less transforming function than is exhibited when a wine-press 'expresses' the juice of grapes".[2] However, the presentation here seems to me to overstate the extent to which the structure of human thinking is derived from discourse and fails to give adequate recognition to the *organization* of intellectual processes prior to verbal activity (referred to by Dewey as "substratum of psycho-physical actions"). Prior to language, "quali-

[1] Buchanan, *Possibility*, p. 23.
[2] Dewey, *Experience and Nature*, p. 166 ff.

tative immediacies" are described as "dumbly rapturous, a possession that is obsessive and an incorporation that involves submergence; conditions found in sensations and passions. . . . It is safe to say that psychic events, such as are anything more than reactions of a creature sensitive to pain and diffuse comfort, have language for one of their conditions". "Ideal experimentation" is spoken of as originating in discourse, whereas it would seem to me sounder to speak of ideal experimentation as clarified, extended, and *reconstituted* by passage to the plan of symbolic activity.

The relation of language processes to thinking which was formulated above, in the first sections of this chapter, may be summarized in the statement that words introduce a new mode of explicit analysis and synthesis into thinking (the last term being used in its generic sense as the implicit correlation of behaviour), provide a new systematic structure of inference, and make possible the type of thinking known as discursive thinking, or reason. Words do not create the structure of mind, they reconstitute its organization.

IX. If Whitehead's definition of symbol, given above, were taken at its face value every conditioned stimulus, at least in so far as involved in the organization of conscious experience, could be classified as a symbol. But, the capacity to analyze consciously one element of experience *as distinct* and simultaneously to recognize it *as related* to other elements (conceptual analysis and construction) is a capacity which is essentially dependent upon the intricate organization of mental life which is, in turn, dependent on the use of established symbols. In other words, the capacity to *recognize* a symbol *as a symbol*, in the sense of Whitehead's definition, is dependent upon the prior verbal (or gestural) organization of mind. On the other hand, common linguistic activity does not necessarily involve any explicit recognition of the words employed as being symbols. There is ordinarily no dicho-

tomy in consciousness between a symbol and its meaning. In short, if the Whitehead definition is taken at face value its application becomes so loose and broad as to mean everything in experience ; but if it be taken as including a conscious recognition of the symbolic character of the signs used, its application becomes altogether too restricted. One recourse would be to regard symbol as a " spoilt word " and pass on, but nothing would be gained and much would be lost by such a procedure. I believe that it is possible to frame a definition which will actually cover most of the items called symbols in any serious discussion, except in the Freudian literature, as follows : A *symbol* is *an item established in social conduct or in reflective thinking as a functional substitute for certain other items in social or individual behaviour*—it being assumed that " reflective thinking " is a type of intellectual activity involving previously established verbal or gestural processes. It is further assumed that an explicit distinction of symbol and thing symbolized is required in the *establishment* of any element as a symbol, but it is not necessarily involved in its further uses, nor even in its acquisition as a symbol by any particular individual.

X. The term *meaning* is even more troublesome, however, because it is already so deeply established in everyday and in philosophical usage with two radically different sets of reference : (1) *any relationship within the implicit processes of the correlation of behaviour* (*thinking*), and (2) any organic or social *function of a symbol*, whether or not this function involves any intellectual process at all. These two radically distinct uses of the term meaning must be scrupulously distinguished. There is, of course, a common ground between them, which probably includes a majority of the actual cases of both kinds, namely, a *symbolic reference involved in the tension of intellectual life*. But all tensional correlation of behaviour is not symbolic. And symbols, as defined above, also feature as fixed links in stereotyped social processes. The term " organic

meanings" might be applied to the tensional elements in the organismic correlation of behaviour; and the term "symbolic meanings" might be applied to the functions of symbols, as defined above. But one of these uses of the term "meaning" should be suppressed in scientific literature in the interest of clarity. Since the latter seems to be most deeply intrenched in common linguistic usage, and to be the most helpful and valuable denotation, I propose that the former usage be completely rejected in serious scientific studies, and that discussions of the "meaning of wealth" and the "meaning of government" be translated into less confusing statements, except when such titles are a treatment of the various usages of the specific terms in question.

Further, it is important to distinguish between several quite *different types of symbolic-meaning*, or reference. Here, however, we are not dealing with radically different functions but with various limiting types which shade off into one another:

(1) The *conventional meanings* of symbols, *i.e.*, their functions in social organization are, as has been pointed out, relatively independent of their relations within the organization of any particular individual. These meanings are frequently quite automatic in their operation—for example, the symbol "charge" instantly means "lie-down" to a well-trained dog, and "leap-into-action" to a well-trained soldier.

(2) The *organic relation of a symbol to its context* is typically a *circular relationship*, whereby the arousal of the context tends to evoke the symbol, and the symbol when enacted tends to arouse its implicit context in the behaviour of the organism, especially in its intellectual processes. Thus a "hint" of a concept is commonly present before its term is pronounced and the formulation of the term intensifies and clarifies the idea that is being "expressed". These two relationships, however, are frequently (although not always, by any means) quite

distinct in their operation, and may be designated as the following special types (3) and (4).

(3) A symbol may be the conditioned reaction to a specific type of situation, or experience-pattern—as when the child learns to say " kitty ! " if a soft black moving thing comes into the room. This may be called *representative* meaning. It is a type of " induction " from the non-symbolic to the symbol level of behaviour. It is often a more or less consummatory process in itself.

(4) A symbol may function as conditioned stimulus to a specific type of social or personal adjustment—as when the pronunciation or the audition of " bye-bye " tends to cause the child to wave his hand, or tends to cause other persons to leave the room. This may be called *instrumental* meaning. It is the fundamental mechanism of the process of understanding symbols and the basis of verbal social control.

(5) Certain symbols may be established in logical habits as quite automatically instrumental to other symbols. This is known as *formal implication.* The compounding of such formal implications is the process which some logicians have aptly designated as " linear inference ".

(6) The formulation of a preferred context of a symbol is *definition.* The systematic formulation of conventional meanings creates the standardized norms of conventional meaning, or conventional definitions, recorded in dictionaries, and elaborated in text-books and scholastic discussions, such as the present discussion of Symbolism and Meaning.

XI. Clarification of the nature of symbolism and meaning greatly simplifies the treatment of another and related moot problem of philosophy, viz., the origin of *general ideas.* Taine and other exponents of the importance of linguistic processes in the growth of mind have usually taken the position that general ideas are a peculiar function of words. This statement of the case is misleading,

although it has an element of truth. The fact is that all ideas are " general ideas ". The failure of European psychology (following the tradition of Descartes and Locke by whom sensory experience was regarded as originally " atomistic ") to recognize this fact resulted in a misconception of the whole problem. The development of modern physiology and Gestalt psychology (which take account of the originally organismic character of all intellectual activity) makes a truer statement of the problem possible.

All ideas are general ideas in the sense that they are response patterns which function in relation to varying situations, and innerly have varying degrees of synthetic intricacy. But the recognition of ideas *as general*, that is, *as applicable to a class of objects recognized as having differences* is dependent upon conceptional analysis, that is, upon the instrumentality of words or similar instruments. Unity-in-difference is a fundamental characteristic of organic intelligence and of all nature, but recognized identity in relation to recognized differences is dependent upon processes which are, in part, social rather than organic in their origin and structure.

A capacity closely related to the recognition of ideas as general is the recognition of names as distinct from the things they mean. Both are phases of the same capacity, namely, to recognize simultaneously a synthesis of relations and an analysis of component elements. One aspect of this development, which varies greatly with different children, is the appearance of the " name question ", often in the second half of the second year: the expression of an expectation of some definite phonetic act as the completion of any new and interesting experience. Thus the child may begin to say, " That is ? " or " What's at ? ", pointing to some interesting object, or volunteer some name and await parental approval or correction. Stern describes this as " the dawn of symbol consciousness ". " Here the child makes the most important discovery of his whole life, that a sound-complex

belongs to every object, symbolizing it, and serving as a mark and a means, *i.e.*, that everything has a name." [1] But, of course, the child himself has no sense of the importance of his new interest in finding the approved phonetic responses to particular things. It makes a new game, however, which some children get very much interested in playing, at an early age, just as formerly they had gotten very much interested in pulling, watching and wiggling their own toes. Stern and Markey both refer to Helen Keller's discovery as typical of this experience. When Helen, at six, learned to make combinations of finger movements as names for different things she was tremendously excited. But she already had been using a crude sort of symbolism with her parents, and could count on her fingers to five. Her discovery was a new and wonderfully efficient means of carrying out interests already formed but long thwarted. There is no evidence of any analogous sudden discovery of symbolism as such in the life of the normal child. There is, however, a gradual distinction of names as different from things, and an increasing interest in all sorts of vocal activity, but most especially in verbal activity and the discovery of the approved and acceptable names of things.

Stern's first two children began to use the "name-question" about the middle of the second year, but this was perhaps partly due to special conditioning in the home of a philosophical psychologist who was especially interested in language. Stern's third child (Eva), however, did not conform to the family tradition.[2] Major reports of his child, in this connection: "By the beginning of the twenty-third month, the child had developed a mania for going about naming things, as if to tell others their names or to call our attention to the things he was examining. He would look toward, point at, or put his hand on an article, speak its name, then look at his companion." [3]

[1] Stern, *op. cit.*, p. 175.
[2] *Ibid.*, p. 180.
[3] Major, *First Steps in Mental Growth*, p. 322.

Moore records: "With the entrance into the eighty-second week (*i.e.*, the twentieth month) the child began to give a name to each object with which he came in contact. If he did not know or recall the name given to it by others he invented a name. . . . By the close of the second year the child invariably asked the name of a new object." [1]

The related phenomenon of the rise of general terms, recognized as such, is illustrated in the following account: At the age of a year and seven months, Günther Stern had developed a strong "nominal expectation", or "verbal set". In unnamed situations the child frequently uttered "This—(?)", with continued suspense. At this age, Günther pointed to a door and said "This—(?)" and his companion answered "door". Immediately he looked across the room, toddled to a door on the other side, touched it, and asked "This—(?)", and again the companion answered "door", and so again a third time.[2] About this time Günther carried out a similar performance successively on seven chairs. In these incidents it is possible to see the rise of clear distinction in Günther's behaviour between a name as meaning some definite kind of thing, and the things meant as differing from one another. In this way a name becomes fixed as a *class name*, the name of different things of the same kind.

The rise of symbolic activity in its early stages introduces little change in the structure of mind, except the differentiation of specific elements of experience, "concepts of substance", as having immediate functional importance and as the subject-matter for further and more intricate investigation. The more elaborate reconstruction of mind through symbolic processes is dependent upon the establishment of various definite relationships between symbols: the growth of syntax and abstraction.

[1] Moore, *Mental Development of a Child*, p. 125.
[2] Stern, *op. cit.*, p. 89.

CHAPTER IV

SYNTAX AND ABSTRACTION

I. THE establishment of mere *chains* of verbal reflexes as in the learning of a string of nonsense syllables is one type of linguistic organization. Such reflex-chains play an important part in the acquisition of conventional idioms and patterns of syntax, and also in the organization of formal schemata such as the order of numerals, the multiplication tables, the order of the alphabet, proverbs, precepts, space-systems, time-systems and technical formulæ.

But the conscious *intellectual organization of conceptional processes* is the fundamental principle of significant syntax, and the growth of abstraction and reason. This process includes explicit symbols as pivotal terms in the whole movement and organization of what may now be called *symbolic intelligence*. But the dominant currents of this movement are themselves at first implicit, organismic and emotional—the habit patterns previously involved in the tensional correlation of behaviour on the pre-verbal level. All definite symbolic organization, like any other organization of habits, is formed within and in relation to the whole physiological context of the individual person and the social and natural context of his milieu.

II. The *structural organization of symbolic processes* emerges very gradually. The first concepts of the child are relatively isolated. The intellectual processes of the one-year-old child focus in real verbal acts only at fairly isolated points. Such symbolic acts are, as we have seen, high points for new intellectual organization. But for about six months or so after the appearance of the first words they remain relatively solitary except as they are

organized in strings of babble or in purely conventional linguistic patterns. The infantile mind cannot hold several complex patterns each including a symbolic focus in simultaneous tensional correlation. There each symbolic act appears as a distinct and complete act, except for its habitual vocal or other organic contexts.

Stern and others have characterized the child's first words as "word-sentences". "The speech units of the child belong to no single word-class because they are not single words but *sentences*. For a word is an expression of a unitary content of consciousness; a sentence, on the contrary, is the expression of a (complete or incomplete) determination of a content of consciousness. . . . The child in learning to speak uses only sentences in the form of words."[1] The recognition of the relatively complete character of the child's first concepts is important, but it is always unfortunate to read into children's activities relationships which are not actually there; moreover, there is a peculiar complexity in the symbolic organization of the sentence which is exactly absent from the first symbolic acts of the child.

The intellectual isolation of the child's first concepts is obscured by the function of words as vocal play, *i.e.*, by the fact that symbolism is at first established as a modification of lallen rather than as a new specific process. The character of symbolic activity in the eighteen-months'-old child is further obscured by his incorporation of patterns of conventional syntax as phonetic units without any recognition of the value of the specific elements included.

As the range and frequency of symbolic activity is extended and as the span of correlation becomes heightened to include more intricate patterns, several symbolic acts may be drawn into the same experimental situation; conception becomes intricate and interactive. At first such interrelation of concepts appears vague and indeterminate. "The written representation of the child's first

[1] Stern, *op. cit.*, p. 164.

several-word-sentences fails to exhibit adequately a common trait—the hesitant ' tossing out ' of single words, interrupted by pauses." [1] " In many of my child's first sentences I could see quite clearly that each word came forth as a separate mental act; the sentence did not represent one total idea, thought of all at once, but a series of details, noted and expressed one at a time, as one might point out and name one by one the separate elements of a picture, without first realizing its total significance at all. For instance, the longest sentences of his first eighteen months, uttered soon after seeing his father climb into an automobile with another man and drive away, consisted of the words, ' Daddy, school, man, auto.' But the inflection of his words, the pauses between, the thoughtful expression accompanying each word, all pointed to the conclusion that his idea was put together bit by bit, like a mosaic, out of separate short and simple mental acts. It has less the sound of one connected sentence than of four brief exclamations, ' Daddy ! ' ' Kool ! ' ' Man ! ' ' Atto ! ' " [2]

In one sense the organization of symbolic activity *never* catches up with complexity of experience. Gradually, however, symbolic activity develops an intricacy and specificity of usage which makes it the instrument *par excellence* of intelligence, and the central factor in personality. But this process lags far behind other phases of the child's development.[3]

" The recent work on infants seems to show that an almost unbelievable amount of organization goes on in infants too young to talk. This shows itself not only in the overt organization of arms and legs and trunk, bodily habits, but equally well in the

[1] Stern, *op. cit.*, p. 182.

[2] Fenton, *Practical Psychology of Babyhood*, p. 137. (This combination shows unusual precocity for eighteen months.)

[3] Watson, J. B., " The Unverbalized in Human Behavior," *Ps. Rev.*, Vol. 31, pp. 275-6.

See also Watson, *Psychology from Standpoint of a Behaviorist*, and Jones, Mary Cover, " The Development of Early Behavior Patterns in Young Children," *Ped. Sem.*, Vol. 33, pp. 537-85.

visceral field, conditioned fears, rages, loves, taking the form of strong attachments to mother or nurse, tantrums, negative reactions to people and the like.

"Our observation shows that the infant cannot before thirty months of age (and how much later we cannot say—possibly very much later) parallel each unit manual habit with a corresponding word habit. To-day in front of me is a child two and one-fourth years of age. He can speak, under appropriate stimulation of object or situation, possibly five hundred words, but sentence formation is of the level of 'Rose take Billy bye-bye'; 'Put Billy's coat on', etc. He is still at the age of incessant repetition of words and sentences. When the nurse brings him in, the father says: 'What did you see, Billy?' and he says: 'What did you see', etc. In contrast, the same infant learned to manipulate at two years of age a rather large, pedalled 'kiddy-car,' to propel it, guide it, mount it, coast downhill, drag it up inclines, and along the sidewalk, and to fly down. He reacted against help, would fall off without crying, mount and start over again. The only verbal parallel is 'Billy ride kiddy-car'. There is no verbal organization which you can call out, relating to turning the bar to the left or right when he turns to left or right; about the pedalling being harder uphill than down; the greater the incline the more rapid his speed, and the like. Yet overt, non-verbal responses are perfect, even after weeks and months of no practice."

Piaget also emphasizes this relatively unorganized character of the child's early conceptual processes and describes it as a *decalage* (disintegration) in the passage of thought from the "motor plane" to the "verbal plane".[1] He finds this to be a persistent trait in the thought processes of children. It is undoubtedly operative in various degrees in various activities of adult life. One may learn how to twist a key in a lock properly and have a good deal of difficulty if required to report the process varbally. Such inferiority of verbal organization in one field of activity may be consistent with an elaborate verbal organization in other fields. Lag in verbal organization is not necessarily equal in all activities at any one stage of development.

[1] Piaget, J., "Les traits principaux de la logique de l'enfant," *J. de Psychologie*, Vol. 21, p. 61.

The relation of sensitivity in intuitive experience to the adequate symbolization of experience is well interpreted by Edgar Lee Masters in the poem, " Silence " :

" A curious boy asks an old soldier
Sitting in front of the grocery store,
' How did you lose your leg ? '
And the old soldier is struck with silence.

But if he could describe it all
He would be an artist.
But if he were an artist there would be deeper wounds
Which he could not describe."

Much attention has been given to cataloguing the various parts of speech used in the first utterances of the infant, frequently on the basis of the dictionary classification of the form which happened to be used by the child with little attention to its actual relations in the child's habits. The difficulties in such a proceeding were pointed out more than thirty years ago.[1] An appreciation of the nature of symbolic activity makes its futility immediately apparent. In the first place, " Syntactical categories, Janus-like, face both ways, towards (conventional) form and towards (organic) notion." [2] They represent an *interaction between traditional patterns and patterns of organic behaviour.* In the second place, conceptual organization in children's speech is highly tenuous, and indeterminate in type. It represents the *emergence of relationship between relatively isolated and co-ordinate concepts,* and the various types of such relationship remain vague and largely undifferentiated. Moreover, this relationship is itself obscured by the phonetic operation of fragments of conventional syntax in the verbal processes of the child.

The ambiguity of syntactical organization is apparent in an examination of the first verbal combinations of

[1] Dewey, J., " Psychology of Infant Language," *Ps. Rev.*, Vol. 1.
[2] Jespersen, *Philosophy of Grammar*, p. 56.

infants. The following list of such first combinations, is offered by Stern [1]:

Examples of Early Sentences of Different Children

da is brrbrr (there is horsie)—looking at picture-book.
da sieh wauwau (there see doggie)—the same.
alle alle milch (all-gone milk).
da is puppe (there is dollie).
da is papa, süa ! (there is papa, see).
mu—herste ? (cow—hear ?).
hildä—kakao (Hilda come to cocoa).
ata—puppe ! (father, a doll).
haim mimi (home, for milk).
danna kuha (auntie, a cookie).
kaffee nein (no coffee there).
babedd dschidschi (Babett on choo-choo).
lulu dai (Lulu is there).
lili alden (Willie stop).
o bennt (Oh, it burns).
guckuk papa, guckuk olla, guckuk mama (peek-a-boo papa, etc.).
mama geben (mama, give).
mama obba obba (mama, stand up).
mama ada (mama walked)—mother was walking with child.
papa nõ (papa in the snow).
opapa bibip (grandpa, bird)—grandfather has brought bird.
baba bisch bisch (papa sleeps sleeps).
gash faw (the glass falls).
aga baw (ball gone).
wead moon (read moon).
betie dat (hay for Jack)—a play horse.
papa cacker (papa has fire-crackers).
mama tie.
a bûle coucou (burning hides)—sun sets.
daj chleb (give bread).
ela nane (come brother).
i pa (Eugene gone).
pépé toutou (dolly, peek-a-boo).

III. The *ambiguity of grammatical relationships* in the early speech of the child is matched by the variety of

[1] Stern, *op. cit.*, p. 183.

conventional syntax in different languages. Beneath the apparent confusion, however, certain psychological principles can be discerned in both cases. As regards comparative linguistics, I must rely entirely upon the authority of experts in language study and anthropology. Sapir, Vendryes, Malinowski, and Jespersen may be cited for this purpose.

Sapir finds two poles operative in the organization of language, concrete facts and relations. The unanalysable independent words seem to belong in most cases either to the class of basic concrete concepts or to the class of pure relational concepts. Independent words and sentences are referred to as the two primary functional units of speech, characteristic of all languages. Also, " no language wholly fails to distinguish noun and verb, though in particular cases the nature of the distinction may be an elusive one. It is different with the other parts of speech. Not one of them is imperatively required for the life of language." [1]

Vendryes maintains that a comparative examination of languages leaves intact only two fundamental and universal " parts of speech ", the noun and the verb, but the distinction between " the substantive sentence " and " the verbal sentence " is treated as still more fundamental. " The verbal sentence expresses an action with reference to a certain time, within a certain duration, attributed to a certain subject, and directed, if necessary toward a certain object. ' *Listen* to the music ', ' Peter *drank* some wine ', ' the horse *will draw* the carriage ', etc. The object of the verbal sentence is to command, to state, or to picture an action. . . . The analysis of the verbal sentence furnishes us with a sort of hierarchy of verbal forms. First, we have the imperative, which in certain respects remains so entirely outside the organized verb that it may be expressed by a noun, or, more frequently, by an infinitive ; then, the indicative, present or past, which states the existence of a fact ; finally, the moods of contingency or conjecture. . . . Entirely different is the substantive sentence by which we express the attribution of a certain quality to a certain object : ' the *house* is *new* ', ' *lunch* is *ready* ', ' the *entrance* is *on the right* ', ' *Cyrus* is *king* ', ' *Zayd* is *wise* '. The substantive sentence comprises

[1] Sapir, *Language*, p. 126.

two terms, the subject and the attribute, both of which belong to the substantive category." [1]

A somewhat longer excerpt may be introduced from Malinowski's illuminating treatment of "The Problem of Meaning in Primitive Languages," especially from the section dealing with the Parts of Speech [2]:

"Real categories there are, on which the grammatical divisions are based and moulded. But the real categories are not derived from any primitive philosophic system built up by contemplation of the surrounding world and by crude speculations, such as have been attributed to primitive man by certain anthropologists. Language in its structure mirrors the real categories derived from practical attitudes of the child and of primitive or natural man to the surrounding world. . . . The outer world interests him in so far as it yields things useful. Utility here of course must be understood in its broadest sense, including not only what man can consume as food, use for shelter and implement, but all that stimulates his activities in play, ritual, war or artistic production. . . . Now let us re-state the nature of this general category in which primitive mind places persons, animals and things. This rough uncouth category is not defined, but strongly felt and well expressed in human behaviour. It is constructed on selective criteria of biological utility as well as further psychological and social uses and values. The prominent position taken up in it by persons, colours it in such a way that things and animals enter into it with a personified character. All items of this category are individualized, isolated, and treated as units. Out of an undifferentiated background, the practical *Weltanschauung* of primitive man isolates a category of persons and personified things. It is clear at once that this category roughly corresponds to that of substance—especially to that of Aristotelian *ousia*. . . . It might be called crude substance or protousia for those who prefer learned terms to simple ones. . . .

"The underlying real category (of action words or verbs) appears later in the child's mental outlook and it is less preponderant in that of the savage. . . . Of this real category of action, state and mood we can say that it lends itself to command as well as to indication or description, that it is associated with the element of change, that is, time, and that it stands in a specially close connection with the persons of the speaker and hearer. In the outlook of savages, the same characters could be

[1] Vendryes, *Language*, pp. 117, 120, 121.

[2] Appendix to *The Meaning of Meaning* (Ogden and Richards), pp. 497-508.

noticed in this category; great interest in all changes referring to the human being, in phases and types of human action, in states of human body and moods. . . . There are still obviously further categories resulting from man's utilitarian attitude, those of the attributes of qualities of a thing, characteristics of an action, relations between things, relations between situations, and it would be possible to show that adjective, adverb, preposition, conjunction are based on these real categories."

Jespersen makes a very helpful contribution towards our appreciation of the nature and origin of grammatical categories. He points out the various degrees of functional dependence between concepts, that is, the recognition of some concepts as *primary* in any particular act of thought, and other concepts with relative status as *secondary*, *tertiary*, and so forth. He then proceeds to make the fundamental distinction between the relation of terms in mere *junction* and the relationship between terms where there exists a genuine *nexus* of thought.

" If now we compare the combination *a furiously barking dog* (*a dog barking furiously*) in which *dog* is primary, *barking* secondary, and *furiously* tertiary, with *the dog barks furiously*, it is evident that the same subordination obtains in the latter as in the former combination. Yet there is a fundamental difference between them, which calls for separate terms for the two kinds of combination; we shall call the former *junction* and the latter *nexus*. . . . In a junction a secondary element (an adjunct) is joined to a primary word as a label or distinguishing mark: a house is characterized by being mentioned as *the next house* or *the doctor's house*. Adjunct and primary together form one denomination, a composite name for what conceivably might just as well have been called by a single name. As a matter of fact, instead of *new-born dog* we often say *puppy*, instead of *silly person* we may say *fool*. . . . A junction is therefore a unit or single idea, expressed more or less accidentally by means of two elements. A nexus, on the contrary, always contains two ideas which must necessarily remain separate; the secondary term adds something new to what has already been named. Whereas the junction is more stiff or rigid, the nexus is more pliable; it is, as it were animated or articulated." [1]

[1] Jespersen, *The Philosophy of Grammar*, pp. 97, 115.

This is essentially the distinction which W. E. Johnson utilizes in his differentiation between the logical function of " the characterizing tie " implied in such expressions as " a cold sensation ", " a tall man ", and

These various pieces of expert testimony may appear, at first, rather confusing and more or less mutually contradictory. But several fairly definite principles can be recognized if the various statements are regarded as convergent:

(1) There appears to be a fundamental distinction between words which represent elements of experience regarded as relatively complete in themselves (the *substantive* category, including from this standpoint, both nouns and adjectives) and words representing elements of experience which are regarded as *transitive*, or incomplete. This distinction is recognized by Vendryes's differentiation of two types of predication, the "substantive sentence" and the "verbal sentence," or in other words, complete and incomplete predication. It is also involved in Sapir's distinction of two poles of the organization of ideas, "concepts of substance" and "concepts of relation."

(2) A logical function more or less analogous to the *sentence*, or *proposition*, is universally represented in the grammatical structure of all languages; and this function involves a *tensional nexus* of intellectual activity between one term which represents an event isolated for further treatment and another term which expresses the response actually selected in the process of judgment.

(3) The *conventional categories* of any language are traditional forms which are loaded with chance accumulations, but which correspond more or less to fundamental types of bio-social activity among human beings in their natural environment; such as the isolation of objects of central interest, the tension of intellectual experiment, the temporal and spatial organization of experience, and so forth. But these bio-social activities are vital functions

"the assertive tie" expressed in the sentence, "The child fears the dog". Johnson, however, attempts to read back a rather elaborate logical structure, including the assumption of a characterizing copula, into the junction relationship.

and constantly shifting in their forms and relationships, and, therefore, inaccurately and inadequately expressed in the various conventional forms of grammatical structure.

(4) The description of *junction* as a single idea fails to do justice to the element of tension involved in the organization of junction; and likewise the conception of a *nexus* as containing two ideas which must necessarily remain separate fails to do justice to the element of integration involved in the organization of a nexus. The two phases are, as Jespersen recognizes, limiting cases of a fluctual organization (although his formal statement does not quite make this apparent). The essential distinction between junction and nexus is the distinction between a relatively unitary organization of several symbolic acts (junction) and a relationship involving a sustained tensional process (nexus).

IV. The gradual *emergence of nexus* between concepts is well illustrated in the first spontaneous verbal combination reported by Watson in regard to his baby.[1]

" When B. had 52 words at his command we noticed the first putting together of two words. This occurred on August 13, 1923, at the age of 1 year, 7 months, 25 days. For a month prior to that date we had been setting a verbal pattern of two words for some time, such as ' hello mama ', ' hello dada ' without results. On this day his mother said ' Say good-bye to daddy '. She set the pattern, ' Good-bye, da '. He repeated after her, ' bye '—then hesitation and five seconds later came the word ' da '. This brought upon him a shower of petting, verbal commendation and the like. Later in the day he said with the same long interval between the two sounds, ' bye—bow wow '. On August 15, two days later, we got him to say ' hello—mama ', ' hello—Rose ', ' tata—Rose ', ' tata—mama ' (' tata ' means ' thank you '). In each case the two-word stimulus had to be given before the response could be called out. He also said ' blea—mama ' (please mama) for the first time. Never up to this time could we get the two-word response without giving the two-word stimulus. On August 24 he put together two words without any verbal stimulus from his parents; for example, he pointed to his father's

[1] Watson, J. B., *Behaviorism*, p. 183.

shoe and said 'shoe—da', and pointing to his mother's shoe, said 'shoe—ma'."

Here it is clear that the word "shoe" is incidental to a total tensional situation, which is eventually resolved in the first case in the word "mama"; and that in the second situation, which emerges subsequently, the focal tension is resolved in the word "papa". The organization of a conceptual nexus in which the first symbolic act (or group of acts) expresses a relatively immediate and apparent phase of the situation and in which a subsequent symbolic act (or group of acts) expresses the relatively consummatory solution of the situation as regards its conceptual organization is the architype recognized in grammar as the *sentence* and in logic as the *proposition*. Because life is a process of fluctuating tensions, in which new problematic situations, as they are solved, constantly give rise to new problems and new judgment processes, the structure of the sentence appears as the characteristic type of developed conceptual thought.

Most of the instances of first verbal combinations in the list given above, quoted from Stern, clearly show a *nexus* of sustained tension between the first word or word-group and the second word or word-group. On the other hand, it is impossible to tell to what extent there is genuine ideational *junction* with word groups (such as "da—see", or "da—is") because these early vocalizations are affected to such an extent by conventional phonetic patterns; as, of course, all speech is. But the eventual growth of ideational junction, or the synthesis of several concepts, so that they approach absolute unity as one concept, offers no special theoretical difficulties.

In the first verbal combinations, however, there is no definite division of functions between the first term or group of terms (as subject) and the second term or group of terms (a predicate). There is nexus, but the typical subject-predicate relation is still lacking. The central tension is quite as likely to be focused in the first term as in the second. In this case, the first term might be called

the predicate (with subject implied) and the second term might be called a modifier of the predicate (as in the sentence " home milk "), but this interpretation is rather forced. These exact grammatical distinctions are wholly lacking ; all that is present is a nexus between two distinct concepts, with varying types of functional relation and degrees of subordination.

The functional distinction between substantive elements such as nouns and adjectives on the one hand and verbs and prepositions on the other hand is not primarily a distinction of function within the sentence, as is the case with subject and predicate ; it is rather a distinction between the implicit context of the words themselves, *i.e.*, a distinction between kinds of concepts. The distinction between substantives proper (nouns) and attributes (adjectives) will be discussed shortly. At present our concern is with a common characteristic : the substantive concepts (nouns and adjectives) are relatively complete in themselves, whereas the verbal concepts are characterized by fluctual contexts which suggest further explication and definition. For example, when a child says " Horsie black ", there is an end of the matter ; but when he says " Horsie running ", or " Horsie up ", the question is immediately suggested, " Running where ? " or " Up on what ? " This makes the grammatical distinction emphasized by Vendryes between substantive elements and verbal elements, and according to the character of the predicate-concept between substantive senttences and verbal sentences. Now it naturally happens that the fixed features of experience are the most easily recognized and most readily taken account of. Therefore, these substantive elements are commonly found as the subject of sentences, and verbal elements are most commonly found as predicates. When a verbal element functions as subject it has a special form such as the infinitive.

Huth has pointed out that it is improper to speak of the young child as employing *complex sentences*. His

thought moves, rather, in " An-und-ab-sätze "—more or less isolated amplifications, elaborations, modifications of thoughts already formed, each being a more or less distinct mental act. Thus the emergence of the complex sentence from the juxtaposition of simple sentences more or less tensionally related is analogous to the emergence of sentence structure from strings of concepts, loosely related. " The situation is changed as soon as the manifold aspects are regarded as characteristic of a single object; from this moment on, many items can be subordinated to one another. . . . The consciousness of the subordination of a thought in the construction of a complex thought is the fully developed ' subordinate-clause-consciousness ' ".[1]

The contrast between the *syntactic subordination* of symbolic processes and the loose *juxtaposition* in vague, fluctual relationships of related isolated units of thought not only characterizes the distinction between the thought of a child and the thought of an adult but also the distinction between free, vernacular expression and deliberate, literary expression. " Where written language makes use of subordination, spoken language makes use of juxtaposition. In speaking, we do not use grammatical connection which encompasses the thought and gives to a sentence the succinct aspect of a syllogism. . . . What particularly characterizes spoken language is that it contents itself with emphasizing the main lines of thought. . . . This spoken language thus approximates to spontaneous language, so-called because it gushes spontaneously from the mind under pressure of strong emotion ".[2]

The gradual increase of the *number of words*[3] in each

[1] Huth, " Die Nebensätze in der Kindersprache," *Zsch. f. päd. Ps.*, Vol. 20, p. 167 f.

[2] Vendryes, *Language*, p. 147.

[3] Smith, Madorah, *Development of Sentence*, etc., p. 17. Records of one hour's spontaneous conversations of a number of children (varying from 11 to 23) in various age groups from 2 to 5 years (with average I.Q. for various groups ranging from 105 to 109).

separate significant utterance, phrase or sentence gives an index of the gradually increasing complexity of the conceptual processes. An analysis by Madorah Smith of the spontaneous conversations of 124 children, at various age levels between 2 and 5 years of age, shows the following number of words per "sentence" at the different levels:

At 2 years . . .	1·7 words per sentence.
At 2½ „ . . .	2·4
At 3	3·3
At 3½	4·0
At 4	4·3
At 4½	4·7
At 5	4·6

There is a fundamental psychological distinction of considerable importance between *mood* and *syntax*. Syntax is the inter-organization of symbolic processes. Mood is fundamentally a matter of the relation of a symbolic process to other phases of activity. The declarative sentence is typically a relatively consummatory, deliberate symbolic process—although, as the name implies, it has characteristically a social motive—and this is usually far more complex than a desire to impart information. The interrogatory and subjunctive moods are characterized by uncertainty and irresolution, in various degrees, to the end. This is frequently indicated by the sustained pitch of the voice. The imperative mood, whether addressed to another, or used in "bracing oneself" for action or directing the course of one's movements, is incidentally characterized by omitting the subject (which is usually obvious to all concerned) because the focal tension is centered in the intentional pattern of the expected consequent behaviour; it is typically concerned with supplying cues for action, rather than in providing elaborate or unambiguous statements of situations. Thus a man playing golf may mutter to himself, "Up a little, steady, shoot, damn! not so high next time."

Conceptual processes may be relatively *consummatory*,

as in song and in the sustained dialectic of mature persons, especially of academic tutelage. Thus Mumford has somewhere described an intelligentia as a body of persons interested in ideas as ideas, that is, as relatively consummatory processes in themselves. On the other hand, persons of extremely practical training and serious bent may find it quite impossible to follow a scientific argument remote from their own immediate personal and material concerns. Such persons are viciously "pragmatic" in their intellectual life; they would be, for example, quite incapable of appreciating the philosophical significance of Pragmaticism.

In general, conceptual patterns, such as sentences, sustain the same relations to other types of behaviour as single concepts do. Sentences may be primarily *representative* of overt situations and feelings, as in narrative and poetry. Or they may be primarily *instrumental* to other types of response and the control of behaviour and situations, as the verbalizations of a man intent on a game when he is not merely "cussing", wailing, or boasting. Most discourse is, however, both *representative* and *instrumental*, *i.e.*, characterized by genuine intellectual interest in the adequate symbolic representation of the matters dealt with and by genuine intellectual interest in the consequent behaviour and objective operations.

In the life of the child, verbal activity, as it emerges from lallen, is usually less definitely representative and instrumental than the talk of adults, and is especially characterized by a vague general intent to stimulate social attention and maintain what Malinowski has aptly called "phatic communion". For this reason, little children will babble along quite contentedly while playing alone, and their speech is often only *loosely associated* with their activity, a sort of parallel running comment, free association series, repertoire of song, catch phrases, primitive metaphor and poetry. Thus children take a great delight in verbal plays, rhymes, repetitions and frequently,

in the school period, in quite elaborate secret codes and languages. Nevertheless, beneath this free verbal play, the more definite types of representative and instrumental relationship between sentences and non-symbolic situations and behaviour are clearly apparent in various degrees. The more definite discipline and organization of symbolic activity is effected through the shock of conflicting opinion and education in co-operative activity. But the story of the growth of rational habits in the child's life must be postponed to a subsequent chapter, and attention must now be directed to the conceptual subordination involved in the growth of abstract ideas.

V. The logical distinction between *substance* and *attributes* is closely related to the distinction between subject and predicate. For example, when a child says " Kitty ! " he introduces an event into discourse with a definite status. He points out, or defines, a *subject* of conversation. He orientates his audience in relation to his own thought, and he orientates his own thought to the behaviour of the group. People may observe that the cat is " pretty ", or " runs across the room ", and the child may stroke the kitten and find its fur soft and silky. In this case " pretty ", " running-across-the-room " and " soft-to-touch " become, as the symbolic logicians say, *functions* of the kitten. They are concepts which include a previously defined thing in their own meaning, *i.e.*, in the situation to which they are organically related as reactions or stimuli. There is an obvious distinction between the *two types of concepts*. The first type of concept, " kitten ", is a fresh determination of *raw experience, i.e.*, non-symbolic experience. Let such a concept be described as a concept of a *thing*. The second type of concept includes a previously defined thing as a specific element in its own meaning. Let such a concept be described as the concept of a *concrete quality*, or *attribute*, of the thing. The formation of the concept of a concrete quality is, like all organic processes, *both synthetic and*

analytic, but in relation to the focal concept it is *analytic*. It is the recognition of a *difference* in the kitten or its *relation* to its total situation. The *thing* and its *qualities* become logical units, with independent status in discourse, and thus they come to have an "*external*" or "*institutional*" relation to one another.

A "thing", however, must not be conceived as static in itself. Its relative stability is a functional relationship with a reference to the organism or phase of experience for which it is a substance. Lightning and gossip are things, and so are the congeries of swirling atoms that we call "sticks" and "stones". A *thing* is simply a pattern in experience that functions more or less as a constant unit in varying circumstances and is accepted as determined for the purposes of any specific inquiry, and within any specific occasion. The failure to recognize the *functional* status and significance of *substance* is the root of the insoluable dilemma with which Aristotle wrestled in the *Metaphysics*.

The difference between a *thing* and a *concrete quality*, as here defined, is simply that a concrete quality includes a previous definite determination of experience as a constituent element. It would not be right to insist that the previous determination must be made by a specific symbolic act. If I pick up my suit-case and remark "Pretty heavy!", the remark obviously has definite relation to a definite something else. This "something else" may be defined by a social gesture, or simply defined to myself in my own behaviour. But for the purpose of any extended investigation the subject of the inquiry must be symbolically defined, or else the mind will inevitably wander and lose the theme. Thus the subject as defined in discourse becomes what Aristotle described as "substance in the second degree".

Abstraction represents a still higher degree of subordination in the organization of conceptual activity. It includes (1) the symbolic recognition of qualities, as such, (*i.e., abstract qualities*), and (2) the recognition of certain

qualities (called *concrete relations*) as originally related to different things. The emergence of concrete qualities and general names may be described as the recognition of diversity in synthesis, or the recognition of synthesis in diversity. But the growth of abstract qualities and concrete relations must be described as the recognition of synthesis of diversities recognized as such, *i.e.*, of qualities or of several different things. The abstraction or analysis of the concept of a relation as a *general relation* between various concepts constitutes a still further intricacy of thought. When the nature of this process of abstraction is appreciated it will scarcely be surprising that children of kindergarten age are barely beginning to acquire the use of abstract concepts of relation.

These general principles can be best clarified by a minute examination of the growth of concepts of *space*, *time*, and *number*, in one child (Suzanne) recorded in detail by Decroly and Degand,[1] in the light of all important previous literature on the subject, and especially in comparison with the records obtained by Clara and William Stern which are especially complete in the case of Hilde. The phenomenon described by Decroly as the appearance of "*continuous quantity*" will readily be recognized as analogous to what is here termed "concrete relation".

In the first place, it is interesting to notice that an undefined recognition of *non-presence* or *transition* precedes any definite recognition of direction, or transition-in-extent, as such, or transition-in-time, as such, and is, apparently, neutral to these distinctions. A habitual sensory pattern which suddenly encounters shock gives rise to what may be called the experience of transition, and may find early symbolic expression in such words as "all-gone" or "bye-bye", and later be expressed as a quality of things, as "all-gone milk", or "no-buttie" (no butter on the bread).

[1] Dr O. Decroly and Mlle Julia Degand, "L'evolution des notions de quantités continues et discontinues chez l'enfant", *Archives de Psychologie*, Vol. 12, pp. 81-122.

But although the first explicit concepts of the child are neutral to the distinction between *transition-in-time* and *transition-in-extent* it must not necessarily be assumed that the preconceptual *schemata* of these relationships are not differentiated in the habit organization of the infant, nor, on the other hand, is there any warrant for thinking that they are. The evidence, so far as I can see, is neutral.

The schemata of *direction* and of *transition* are, however, clearly differentiated in the child's early behaviour. Orientation to *direction* hardly needs to be demonstrated as present before symbolic activity. It is apparent in new-born babes.[1] The discrimination of *extent* and *arrangement* of stimuli is equally well established before the dawn of concepts. This applies in the year-old child to the crude discrimination of numbers of objects used by the child in play. Decroly demonstrated that before *any* symbols of quantity were developed, his child was able to retain during play the pattern of two or three objects. In the early part of the second year, if Suzanne was playing with two or three objects, and these were quietly taken away, she noted the loss and remained dissatisfied with the return of only one of the objects. She was, however, at this time not able to carry the discrimination of four objects from three objects.[2] Similarly behaviour patterns and sequences, capable of discrimination in symbolic activity as time series, are obviously operative in the pre-conceptual habits of the child.

Stern recorded that Hilde began to make the definite time distinction *now*, as contrasted with *later*, at just two years of age. In a few months such definite expressions as " nuff food, now go sleep ! " and " not-yet cakes, again bye-bye " began to be frequent. It may be noted that these first expressions of time all refer to a *continuous schema of present-future*, within which the immediate and the future are first differentiated. This indicates an

[1] Blanton, Margaret, " The Behavior of the Human Infant during the First Thirty Days of Life," *Ps. Rev.*, Vol. 24, pp. 456-83.

[2] Decroly and Degand, I, p. 88.

advance in conceptual development over the mere symbolic *reaction* to transition, because it involves the definite instrumental use of time-symbols in the organization of habits and social relations. Similar expressions appear with Suzanne at two years and three months and become well established shortly after. The first explicit use of *soon* and *at once*, in contrast, appears in Suzanne's case at two years and eight months. Taking a glass from her, the nurse said, " You shall have it in a little while ". But Suzanne replied, " Not lit'l while, right 'way ! " (Non, pas tantôt, tout fuite !).[1] Such immediate differentiations of *present-and-gone, now-and-later*, appear long before any abstract schema of discontinuous times, such as is involved in the distinctions of *yesterday, to-day* and *to-morrow*, becomes established.

The *immediate* qualitative discriminations of space schemata are more *varied*, and therefore *definite concepts of space* seem to develop at an earlier period than *definite concepts* of time. Stern concludes: " These groups (adverbs of space and time) afford us an insight into the development of the two prime-forms-of-intuition, space and time. From the assembled material (reference is made to a table of comparisons of the use of adverbs of space and time, collected from the German literature on speech development) it is apparent that the adverbs of place enter much earlier than the adverbs of time." [2] But Stern does not distinguish between *direction* and *extent* in space, and he excludes from the list of " temporal adverbs " the expression of mere transition already discussed as a primordial concept. Taking Hilde's case as typical, the first adverbs of place, as listed by Stern, come only three and a half months before the use of *now*. But the adverbs of *direction* present a varied catalogue such as *in-there, under, around, up, on*, and *in-house*, by the end of the second year in the case of advanced children. *These early symbols of space all refer to continuous habit patterns or definite*

[1] Decroly and Degand, II, p. 126.
[2] Stern, *op. cit.*, p. 231.

phases of such patterns. They do not exhibit a discontinuous or serial character any more than do the first adverbs of time.

The development of abstract discontinuous schemata of time and space is subsequent to the development of number, and is related to this development. Recognition that *yesterday*, *to-day* and *to-morrow* had reference to certain days was gradually developed during the fourth year by both Hilde and Suzanne, but a clear grasp of the relationship symbolized by these terms was still confused and *only became established in the fifth year.* The correct use of *yesterday*, *to-day*, and *to-morrow* as names of days, and a fixed order of seven days making a week, involves abstract chronological schemata which first become fixed late in the pre-school period or in the early school grades. These words, to be sure, appear in the vocabulary much earlier, but they are used indiscriminately or with reference to continuous undefined past as such, continuous present, or continuous future.

The following is a translation of the summary of the development of notions of present, past, and future as recorded by Degand.[1]

Ideas Connected with the Present

Age in months and years.	
2:2	Association with the moment when S. should have a piece of candy, when different things should be done.
2:3	Idea of the *present* as compared with the near future.
2:3	Use of *now* in the sense of *now to me.*
2:6	Use of *now* in the sense of *at this moment.*
2:8	Differentiation between present (toute de suite) and future (tantôt).
2:10	Use of *quick* in the sense of immediately.
3:0	Astonishment at a change in the routine of the day.
3:7	Does not comprehend " *What day ?* "
5:0	This *evening* means when one goes to sleep.
5:3	Wants to know why Sunday recurs regularly. How does one know it is Sunday ? Is this Monday ? Why isn't it Sunday ? Why does one not work on Sunday ?

[1] Decroly and Degand, II, pp. 158-59.

Ideas Concerning the Passage of Time

Age in months and years.

1:10 There ! marks something finished.
2:0 *Gone* marks something finished.
2:1 Use of past participle, by itself, to express something finished.
2:1 Idea of the immediate past.
2:3 Idea of the near past (2, 3, 4 or 5 days) and use of the past participle with auxiliary to express this.
2:6 *Done* (fini) marks something completed.
2:6 *Just now* (tantôt) used to refer to a past event.
2:6 Memory of past events within 15 days.
2:7 *No more* refers to the end of something, *e.g.*, No more rain.
2:9 Use of the imperfect to refer to something present the moment before.
2:10 Use of *this morning* to define an event as past.
3:0 Use of *this noon* and *this evening* at random, to define an event as in the past.
3:1 *Yesterday* means *this morning*.
3:3 *When* (quand) : When I was small.
3:4 Now-then (alors) meaning at this moment.
4:8 *Yesterday* is sometimes employed correctly.
4:9 *Another time* used of the distant past.
4:9 *Sunday*, meaning last Sunday. *One Sunday* means two or three Sundays ago.
4:10 *Day before yesterday*, meaning past time in general (except Sundays).
5:0 Use of *last Sunday*.
5:1 Use of *last year* and *this year*.

Ideas Relating to the Future

2:5 Use of the infinitive with future value (S. aller à R. et. cet.).
2:5 Idea of something to come, but suggested and supported by the sight of an object.
2:7 *Just now* (tantôt) used in a phrase, indicating an action to come.
2:7 *No more* equal to, *I will no more*.
2:10 *To-morrow* equal to *in a little while*.
2:11 Use of *by-and-by*.
3:0 Use of *this morning* and *this evening*, meaning *in a little while*.
3:7 Use of *this evening* practically correct.
4:0 Use of *to-morrow* exactly of an event to come.
4:1 *To-morrow* is associated with *Sunday*.
4:8 *To-morrow* is employed for the near future (to-morrow or the next day ; just as next week is used for the more distant future).
5:0 Use of *next Sunday*.

The growth of *number* is the purest illustration of the process of abstraction. In fact number *is* essentially an abstraction of the organization of experience in alternations of synthesis and analysis, as such, regardless of the particular nature of the processes involved. The *unit* of number is a behaviour-synthesis, or reaction-complex, which remains unchanged in its internal organization while undergoing successive alternations and inhibitions in its wider relations with other behaviour patterns. The unit of number is, in other words, simply the *general concept*, but its function as " number " is dependent upon the growth of a more intricate organization of abstraction. The rise of a general concept as such involves the appearance of *series*, or the recognition of a general concept, or identical thing, or unit, as sustaining a succession of changed relationships, such as "button, button, another button". Of course, the existence of functional syntheses or unities in nature underlies the rise of number in the human organism. The growth of the formal schema of number is, however, essentially a process of symbolic abstraction.

Counting, which is the primary phase of number, beyond the rise of the general concept and the series, appears as the bringing together, or rhyming, or *synthesis of series*, *i.e.*, a synthesis of analytic tendencies as applied to different movements or things. Counting, in its elementary phase, is typified by a man tapping his foot in rhythm to beats of music, or saying "eni, meni, mini, mo" as he touches successive posts in a fence, or opening his fingers successively as he takes steps across an open space. A natural development of this primitive habit of counting is the gradual selection of certain pattern series, such as saying certain nonsense syllables or touching fingers successively as especial *pattern-series*. The only criterion of a good pattern series, besides convenience, is that it should physically represent differences in the successive counts. For this reason the beats of a metronome would be worthless, whereas the movements of a shadow across a marked-off space would be perfect.

Thus it is apparent that the illustration of a man tapping his foot affords a type of counting which has no fruition, and therefore no historical significance in the history of number. On the other hand, the use of strings of beads, and marks on paper, and strings of nonsense syllables has great historical significance. Our decimal system is, of course, a combination of the nonsense syllable pattern (together with marks on paper) and the finger pattern, being organized in tens because we have ten fingers. Twenty apples are, of course, two both-hands of apples, and a century is a both-hands of both-hands of years. There is ample anthropological evidence for this interpretation.[1] These same two types of series patterns, nonsense syllables (such as " eni, meni, mini, mo " and " one, two, three, four ") and finger-counting are the predominant types of spontaneous counting in children.

Helen Keller, before receiving any systematic instruction in manual language, had learned to count to five on her fingers. Various observers report that children spontaneously use both their fingers and the strings of counting syllables which they are taught. These tendencies are clearly apparent in Hilde Stern and Suzanne Decroly, of whose development we have the especially accurate records already referred to. Thus Hilde Stern at the age of one year and nine months, began the habit of touching objects and saying, " T'ree, two, t'ree, t'ree," and so forth. At two years and one month she took several handkerchiefs saying, " One, two, four, four, three, four ". Similarly, a month later, she played with four dolls, saying, " two, three, five, six, two, two, six, three ". Hilde was taught these series of syllables and began to use them more rapidly than Suzanne. At one year and six months Suzanne began to use " aco " (encore) for *again*. At one year and ten months she waved a baton in rhythm, saying " a-two, a-two, a-two ", as she stood in front of several nursery school children who, seated on a

[1] See, for example, Harold C. Brown, " Intelligence and Mathematics," in *Creative Intelligence*.

bench, swayed in time.[1] At two years and three months she was able to copy little patterns of two or three sticks placed in a row, but likely to err in copying patterns of more than three sticks.[2]

In the development of *counting*, described thus far, only two stages are involved. In the first place, there is the distinction of series, already described as one phase of the use of general concepts. Perhaps this might be called an analysis *in time* or an analysis *in space* (according to one's metaphysical proclivities); but I can see nothing gained by either statement.[3] The second stage is the rhythmic synthesis of several such series-habits; one of them usually being a *symbolic* series pattern, such as a verbal series or system of public notation. The development of a particular verbal series as a *typical series-pattern* is the natural product of this development. Here we have a synthesis of diversities, recognized as such, as in the recognition of concrete relations and abstract qualities, and roughly synchronous with their development. Such synthesis of series is a type of concrete relation.

The appearance of *cardinal numbers*, however, involves a further stage of abstraction beyond counting in series, and is a type of the abstraction of relations. It involves the recognition of a synthesis of series as a general type of relationship. Thus the primary experience of number, as such, must naturally be the experience of the number *two* (or else one as related to more than one). The following is the account of Suzanne's first use of a number concept. Her age at the time was two years and three months[4]:

" She had the glasses of a person who was near her. ' *Glasses* ' she said. ' *Two* spectacles ' said the older person. And the child answered ' Two glasses '. Then, poking her little fingers on the cheeks of the person with whom she was talking, she said ' Two eyes ! ' . . . (Two days later she was in the nursery school). She recognized some little boots. ' Boots of L., there, *two* boots ! '

[1] Decroly and Degand, I, 89.
[2] *Ibid.*, I, 91.
[3] Kant prefers the former, and Bergson the latter.
[4] Decroly and Degand, I, 96.

said she, pointing to one after the other. (In the following weeks she said ' *Two* pencils ', ' *Two* rulers ', ' Two oranges on the windows ' and so forth.) "

Somewhat later Suzanne also began to use *one*. (Two years and six months). Stern reports the number *one* as developing about the same time as the number two (early in the third year) but does not report the details of its use. From this time on, the number *one* and the number *two* were used constantly. Suzanne never tired of noting the patterns of *ones* and *twos*. By the end of the third year she had come to recognize that both these symbols, and also the more general symbol " many ", were related to the one abstract symbol, " How much ? " In other words, she was beginning to form the still more remote abstraction, or " category " of *number*. Near the end of the fourth year the numbers *three* and *four* came to be recognized as having some sort of definite relation to the concept of *many*, and early in the *fifth* year the number *three* became definitely fixed. Shortly before this happened Suzanne had begun to play with combinations of *one* and *two* and *two* and *two*, such as describing four dolls as " Two mammas and two papas ".

The early development of number in the child in the three terms of *two*, *one*, and *several* (or many) is interesting in relation to the parallel development of those languages, such as the Greek, which represent dual, singular and plural in grammatical form. To persons accustomed to complicated mathematical computations the presence of a dual number in grammar seems strange. But psychologically it appears to be the earliest and simplest numerical determination, involving the least complexity of abstraction, so that *two and one* is as simple, if not a simpler, relation to conceive than *three*.

The development of series of numbers (abstract series of the abstract symbols of syntheses of series), the algebraic notation of various syntheses of such series, and the geometrical representation of numerical and algebraic series has been discussed at length by Brown, Rignano

and others and lies beyond the scope of the present inquiry.

The further recognition of various numerical representations as capable of functional substitution affords the experience of *numerical equality*—for example, the recognition of two and two steps as covering same space as one and two and one steps, or " one, two, three, four " steps, as in walking across a rug. The development of abstract numerical systems and relations of equality affords, as is generally recognized, the most intricate and versatile system for the symbolic organization of experience, and is the essential instrument of a complex civilization. The account of this development lies beyond the scope of the present inquiry. It is important, however, to emphasize the obvious fact that mathematical relationship is essentially dependent upon the organization of various total phases of experience in terms of especially selected units of experience, or general concepts ; and its value depends upon the extent to which various phases of experience can be interpreted in terms of such selected events, or units.

Meanwhile the growth of many other types of differentiation within " continuous " relations of extent are developed rapidly in the life of the child, and quite subtle nuances come to be symbolized, such as " very little " and " up high ", and the relations of part and whole appear. The quite elaborate development of concrete relations and abstract qualities in a three-year-old child is well illustrated by the following little incident reported by Decroly. The story gives a delightful picture of Suzanne as a dispenser of justice. " She played in the court with J. and P., her two friends. She was given a long stick of barley-sugar. ' Ah ! ' she exclaimed, and she broke off a piece and gave it to J., and then a very little piece which she gave to P., saying ' I go give a *lit'l* piece to P. 'cause he hit L.' She kept the rest for herself ; she had the largest piece." [1]

It is apparent that the process of abstraction is an

[1] Decroly, I, p. 109.

indefinite process. In the organization of knowledge the predication of more and more remote abstractions, or *categories*, is possible. Some categories naturally prove more effective than others in the unification of experience. Categories are not mutually exclusive, however, for there are infinite varieties of the organization of the same events in experience, and the events of experience are constantly changed and augmented. Nevertheless, various rather definite hierarchical organizations of experience have gradually been developed, as the significant symbols of symbols, and abstractions of abstractions. Metaphysics might be described as a sort of *œcumenical council* of categories, an adjustment of the implications of various episcopacies of concepts. It has always been one of the great ambitions of metaphysicians to discover a papal concept capable of synthesizing, as ultimate predicate, all hierarchies of the rational organization of experience. Substance, Essence, Number, Space-Time, Experience, Matter, and the Absolute Idea are among the categories which have been nominated as candidates. No attempt is here made to found a Symbolic See. The interest in the present study is rather in the examination of the origin and nature of concepts, as preservers of wisdom, and as harbingers of new experience. Abstract concepts are partners in the organization of life with muscles and wistful fantasies. Excellence of thought develops with the mutually sensitive growth of abstract and concrete experience.

CHAPTER V

THE INTEGRATION OF SYMBOLIC PROCESSES IN THE GROWTH OF REASON—SYMBOLIC MECHANISMS AND INNATE FACTORS IN INTELLIGENCE

I. REASON is thought controlled by explicit statement, rather than by merely intuitive sensory, motor and visceral processes. *To reason is*, in the generic sense of the word, *to syl-logize*, to state together.

All judgment is, physiologically, a tensional adjustment of minute processes. In this tensional adjustment the various tentative responses evoke associated *accessory* and *deterrent* reactions, and these function as the physiological controls of judgment. The adjustment is a strife between various competing reactions as facilitated or retarded by their various physiological allies and antagonists. The eventual issue is, in Sherrington's formula, the " final common path " of maximum synthesis and minimum inhibition. But these physiological controls are, in the early life of the child, entirely unrecognized. The child decides that the leopard is a " kitty ", but he can't tell " why ". Reasoning is an *explication* of judgment.

II. Gradually there dawns upon the child's recognition the momentous fact that every acceptable statement has a " why ", or as the logicans say, a *ground*. Just at present the author is living with an amateur logician who demands the grounds for nearly every statement made. It is a consolation for me to realize that she is in the process of achieving rationality. She is learning to make explicit *connections* between different ideas.

Piaget states that when the child asks " Why " he is most commonly seeking a " psychological motivation ",

sometimes a " causal explanation ", sometimes a " conventional justification ", rarely a " logical justification ", and then offers the following analysis of the spontaneous whys of one boy aged six, collected during ten months of school life.[1]

	Numbers	Percentage (fractions omitted)
Whys of causal explanation . .	103	29%
Whys of psychological motivation .	183	50%
Whys of justification	74	21%
Social rules	14	4%
Scholastic rules . . .	55	15%
Definition, or logical justification .	5	1%

Lucy Sprague Mitchell suggests an entirely different approach to the child's questions, although she is discussing, in this connection, the three-year-old child.

" Above all his early stories must be of activities and they must be told in motor terms. Often we are tempted to give him reasons in response to his incessant ' why ? ' but when he asks ' why ? ' he is really not searching for reasons at all. A large part of the time he is not even asking a question. He merely enjoys this reciperative form of speech and is indignant if your answer is not what he expects. . . . And even when a three-year-old asks a real question he wants to be answered in terms of action or of sense impressions and not in terms of reasons why. How could it be otherwise when he still thinks with his senses and muscles and not with that generalizing mechanism which conceives of cause and effect ? The next time a three-year-old asks you ' Why you put on shoes ? ' see if he likes it to be told, ' Mother wears shoes when she goes out because it is cold and the sidewalks are hard ', or if he prefers, ' Mother's going to go outdoors and take a big bus to go and buy something ' : or ' You listen and in a minute you'll hear mother's shoes going pat, pat, pat downstairs and then you'll hear the front door close bang ! and mother won't be here any more ! ' ' Why ? ' really means, ' please talk to me ! ' and naturally he likes to be talked to in terms he can understand which are essentially sensory and motor." [2]

[1] Piaget, *The Language and Thought of the Child*, p. 197.

[2] Mitchell, *Here and Now Story-Book*, Introduction, pp. 6-7.

In part the discrepancy between Piaget's treatment and Mitchell's treatment is due to the fact that Piaget is dealing with the activity of an older child. The six-year-old is much more interested in working out explicit connections between things than the three-year-old. It is also clear, that Piaget is reading mature rational distinctions into the child's interests. It is rather artificial to attempt to analyse a child's questions into various categories of inquiry. He is usually just seeking a connection—he has no idea *what kind* of a connection he is seeking; he does not ordinarily distinguish between psychological motivation and causal explanation; and certainly he does not distinguish between conventional rules and logical justification. His questions are frequently mere bids for attention or protests against parental suggestion. But it is a very important truth that the nursery child does more and more seek explicit connections of things, and gradually builds up a system of relations which eventually becomes capable of classification into various logical categories. A record of "whys" asked by any child shows a mixture of questions expressive of interest in understanding things and their relations, on the one hand, and expressions of mere dissatisfaction or calls for further conversation, on the other.

Complete record of the "Whys" of one child, aged four years and eleven months, during four days

1. Why do you have this box for your feet ?
2. Why did they bring the bed down from the attic ?
3. *Take your dollies in now, Joyce !* Why ?
4. *Fix the rug ! You caught your feet under the edge of it !* Why ? Why did I ?
5. Why did you take two cookies ?
6. Why does the watering-pot have two handles ?
7. Why did he put the solder in so many places ?
8. *The song-sparrow isn't pretty to look at*—Why isn't he pretty ?
9. *The bobolink has a brown coat in winter.* Why ? [1] Why ?
10. *It was careless of you to lose your shovel.* Why ? [1] Why ?

[1] No answer given.

11. *This is your orange juice.* Why.[2]
12. *You are to sit here, in Daddy's place?* Why?[1]—Please, Mother, tell me why.
13. Do we have bangs at the back of our heads? *No!* Why?[1] Why, Mother?
14. *And then he made a mast for his little boat.* Why? Please tell me why he made a mast.
15. Why do you wash the hair off (the razor)?
16. (Putting on bathrobe without putting her arms in the sleeves) Is this good? *No.* Why?[1]—(impatiently) Why? Speak out! (but then without waiting for an answer) Because it wouldn't stay on. *There, you thought it out for yourself, didn't you?*
17. Why did you stub your toe? *Because I wasn't watching out.* Why?
18. *I will tell you a story about this willow plate*—Why?[2]
19. *Please hurry, Joyce!* Why?[1]—Because you want me to wash?[1] Why didn't you wash first? Because you knew I wanted to go with Daddy?
20. See the little tea things! Why did we buy them? *Why do you think?* Because we might use the others all up.
21. Why did you use both a fork and a spoon in making that cake?
22. Why did you sit in that chair, Mother?
23. *Please don't climb in that chair!* Why?[2]
24. Why are you putting up that screen?[2]
25. Why are you opening that window?[2]
26. Why does the little chicken grow in the shell?[3]
27. *You can't win by jumping up and down!* Why?
28. Jeremiah, Jeremiah. He got into a pit, didn't he? Why did they put him into a pit?[4]
29. *Please be careful not to break the bean-plants.* Why?
30. I saw your blue apron through a crack in the door. I thought it was a spider. *A spider isn't blue, dear!* Why?[1]—Please, Mother, tell me why a spider isn't blue.
31. You shouldn't talk about a visitor's beard, Joyce, until he has gone! Why?[1]—Please tell me why.
32. Why don't you have a beard, Mother?
33. I want to cut my eyebrows in half! *Oh! you wouldn't want to do that!* Why? Because I would look funny?

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[1] No answer given.

[2] No answer given. The question was not repeated.

[3] This question was asked early in the morning. No egg or chicken had been seen that day, and none had been mentioned.

[4] Part of the story of Jeremiah had been told several days before but there was no apparent connection between this remark and the conversation in which it occurred.

34. Why do we have eyebrows ?
35. Why must I hurry ?
36. Why should I wait for candy until after supper ?
37. Why did you speak to that man ?
38. *Please don't bang the car-door ?* Why ? [1]
39. Why did the chickens walk in front of the car ?
40. *It is time to go home for dinner now !* Why ? [1]

A large number of the questions in the above list were clearly motivated by genuine curiosity as indicated by attitude and attendant circumstances as well as by their content (§§ 2, 6, 7, 8, 9, 13, 14, 15, 26, 28, 30, 32, 34). These questions show real interest in working out the conceptual relations. On the other hand other questions are equally obviously mere bids for attention or protests against prohibitions or requests (§§ 3, 4, 11, 23, 29, 38, 40—also 24, 25 asked to delay final " good night " at bed time).

As a practical suggestion, it is very helpful for the parent to distinguish between incidental uses of " why " which do not really ask a question, and " whys " which are expressive of eager interest. The first may be ignored without loss to the child ; whereas neglect of the latter is a waste of precious opportunities. One device, in dealing with the later pre-school child, which both aids the child's mental growth and saves the nerves of the parent or companion, is to require the child to make a complete statement of the questions he really wants answered—as " Why do you wear shoes ? " or " Why must I go to bed ? "—and to ignore the single " Why ? " " Why ?" " Why ? " so easily touched off in the child's habit organization.

III. Three fairly distinct *types of symbolic structures* are involved in all systematic reasoning—(1) systems of reference, (2) systems of inference, and (3) the formal structure of contradiction and fixed types of contrary terms. *Systems of reference* are essential to the progessive analysis of experience, the discovery of specific subjects

[1] No answer given. The question was not repeated.

of exact inquiry. For example, it would be impossible to think about mathematical relations apart from fixed numerical systems and spatial schemata, and the discussion of familiar problems would be meaningless to one who was quite lacking in "historical background". The thinking of the child, limited as it is to the Here, and Now, and the Apparent, is unable to include any very systematic exploration of experience. Again, one cannot put statements together or employ general principles in reasoning until some wealth of statements available for experimental manipulation have been already accumulated, since reasoning involves elaboration of the mutual implications (synthetic and contradictory) of previously acquired *lines of inference*, or more simply, items of *knowledge*. And systematic inference is equally dependent upon acquired systems of *contradiction*.

IV. Inasmuch as reasoning involves such highly organized symbolic and abstract schemata, and inasmuch as we have already studied the slow accumulation of such systematic relations in symbolic activity, it is fairly obvious that the thinking of the child (whatever his natural endowments might be) must differ radically from the thinking of adults whose symbolic processes have long been undergoing formal organization along various lines in social activities, discussion and reflection. Symbolic activity itself is, as we have seen, essentially a social process. But in the life of the child symbolic activity is swamped in an *unsocialized* or "*autistic*" *context* (to use the familiar term of abnormal psychology), *i.e.*, an implicit organic context predominantly emotional and devoid of verbal or other symbolic organization.

V. It will be interesting, with these considerations in mind, to study two unusually competent and wholly independent formulations of the chief characteristics of children's thinking as contrasted with the thinking of civilized adults: the presentation of Jean Piaget on the basis of studies in the Institute J. J. Rousseau at

Geneva,[1] and the presentation of Norsworthy and Whitley of Teachers' College, Columbia University.

Summary and Criticism of Piaget's Description of Traits

1. *Egocentrism.* This is an unfortunate term for it suggests that the thought of the child is definitely oriented in self-reference; indeed Piaget himself does not seem to wholly escape the influence of this misleading connotation. The term is intended to indicate the *autistic* character of the child's thinking but to avoid the pathological connotations of this term. The thought of the child, as in psychopathic cases, is characterized by incomplete symbolic organization. It is *unsocialized*, to a large extent, or in other words it is implicit and sensory, rather than explicit and verbal. It is clear that it is not necessary to assume any "introversion" in the child's thought, but simply the lack of symbolic organization.

2. *The Difficulties of "Taking Cognizance" and the Lag in Verbal Organization.* (Piaget: Les difficultés de prise de conscience et la décalage des opérations sur le plan de la pensée.) The significance of this fact has already been discussed in the previous chapter.

3. *Incapacity for the Treatment of Logical Relations and Narrowness of the Field of Attention.* The psychological trait described in Chapter I as the capacity for neural correlation is the primary phenomenon referred to by this designation, but it also has reference to the lack of conceptual relations. In this latter reference it points to the same fundamental trait as the following conception.

4. *Incapacity for Synthetic Treatment of Concepts and (conversely) mere Juxtaposition of Fragments of Knowledge*

[1] The researches of Jean Piaget and his associates constitute the most important contribution to the understanding of the thought of children of this age. Some of the interpretation involves the use of inconvenient concepts, and the data are necessarily limited. The work is of a pioneer character and will inspire new experiment and lead to more complete formulation. The results are published in two volumes, now in English translations: *The Language and Thought of the Child*, and *Judgment and Reasoning in the Child*. For the above summary, see the last chapter of *Judgment and Reasoning*, which incorporates with slight alterations the article in the *Journal de Psychologie*, 1924.

in the Child's Mind. This characteristic is due to the lack of well-developed organization of knowledge and abstract relations, and to a psychological factor referred to in the previous trait.

5. *Syncretism.* This trait is compared by Piaget with the phenomenon described by Freud as *Condensation*, the tendency of several patterns, *e.g.*, several persons, to become "fused" in dream life and pathological organization, and so to appear as a single person, but upon examination to show characteristics of several original patterns, *e.g.*, several different persons or things, and also with the corollary phenomenon of *Transference* of attitudes and characteristics associated with one object to other objects.

This trait is, as Piaget points out, merely the inverse characteristic of the lack of fixed, systematic organization of thought. Unverbalized thought, or inadequately verbalized thought, is fluctual and "syncretistic"; it lacks clear distinction and logical organization.

6. "*Transduction*" (as contrasted with discriminating inference) *and Insensibility to Contradiction.*

7. *A naïve "Realism"* (by which Piaget means the acceptance of all ideas as "real," and the lack of clear distinction between "subjective" and "objective") *and Incapacity for Theoretical Reason.* Here again Piaget's choice of terms involves difficulty. The trait described by Piaget has obviously nothing to do with philosophical Realism—unless it be by a rather forced analogy.

The child, until twelve or thirteen years of age, Piaget finds, if asked to answer an imaginary problem, either is unable to consider it at all, or else he accepts the hypothetical suggestion as absolute, even though it be quite absurd.

According to Piaget, *reasoning from hypothetical premises*, is not possible in children less than eleven or twelve years of age. Infants are absolutists. The philosophy of *as if* is a rather mature achievement. "Up till about the age of eleven the child cannot keep to a formal chain of argument, *i.e.*, to a deduction based on given premises, precisely because he does not admit the premises as given.

He wants to justify them at all costs, and if he does not succeed he refuses to continue the argument or to take up the interlocutor's point of view." [1]

The list of traits given by Piaget may be compared with characteristics of the thought of young children described by Norsworthy and Whitley.[2]

" In the first place, *their supply of facts is not adequate.*

In the second place, *the material they do possess is apt to be inaccurate.* . . . Feelings of meaning, especially abstractions and concepts whereby one may substitute for the total state the reaction toward one quality, or the concept standing for hundreds of gross sensory experiences; feelings of logical relationship, that is, of cause and effect, of coordination, of subordination, of concession and so on; constructive and verbal images whereby one may foresee the outcome of the present or plan for the future; judgments of the explicit type which, replacing the unreliable verbal image, are more permanent and at the same time show reflective results—all these are necessary before thinking can be carried far and to successful conclusion.

In the third place, *the character of children's attention makes accurate thinking difficult.* . . . Children's attention tends to lack in concentration and to be easily distracted and these characteristics are the more marked when the attention is not given to perceptual objects but to ideas. Children may have all the data necessary to solve a problem . . . and yet reach an incorrect solution because they cannot hold attention to the question long enough and clearly enough to make use of what they have.

In the fourth place, this last tendency involves more danger in accuracy from the fact of the *lack of systematization of a child's mental life.* . . . Their mental life is in a chaotic condition, the connecting element between ideas being mere propinquity, or a superficial likeness, even a verbal resemblance.

[1] Piaget, *The Language and Thought of the Child*, p. 185.

[2] Norsworthy and Whitley, *Psychology of Childhood* (First Edition). The two lists were developed entirely independently, the American study being published in 1918, and apparently without influence on Piaget's work.

In the fifth place, *the type of association* characteristic of children is much like that of the lower animals, viz., *association of wholes.* The mind works coarsely in whole situations, and, therefore, discrimination and analysis are difficult.

In the sixth place, *children lack a critical attitude,* and hence often go astray in their thinking. This lack of criticism works in two ways : because of it, children accept some minor, unimportant element as the essential one in the problem, and also they fail to weigh their results. . . . To pick out the right element from among the many offered requires keen discrimination, a valuing of the element from the standpoint of the problem ; in short, it requires a critical weighing of the respective merits of all the possibilities offered. This children do not do. . . . The child who, having been accustomed to hearing stories told to her at bedtime, asks to be put to bed in the morning, in order to have stories told, is a case in point. . . . This lack of critical attitude is manifested again in the attitude of children toward their results. They tend to accept them without any further consideration."

The characteristics of children's thinking described in these two empirical accounts can be shown to be due in large measure to the lack of well-developed symbolic systems.

VI. Capacity for self-criticism, which is one of the traits emphasized in the formulations given above, is essentially dependent upon the presence and operation of formal structures of contradiction. The *principle of contradiction* is grounded in organic processes but systematic reason is dependent upon symbolic mechanisms which can only be very gradually accumulated. The discussion of the growth of the system of formal contradiction will furnish the best clue to an appreciation of the fundamental principles involved in the growth of formal reasoning in the life of the child.

It will be remembered that in the work on conditioned reflexes, as carried out by Pavlov and others, unrelated or indifferent stimuli show a high tendency to be inhibitory to any specific conditioned reflex. The reason for this is not altogether clear, and does not concern us here. But it is important to notice that this principle

does not apply, in equal degree, to the more intricate reaction patterns discussed under the heading of "compound stimuli" in the first chapter. It applies even less, apparently, to the more intricate implicit patterns of human intelligence. In other words, human behaviour is characterized by a high degree of plasticity. There are, to be sure, strong antagonisms between reaction systems in human life. Reaching and withdrawing, nursing and refusing to nurse, and so forth, are basic antagonisms in infant life. And in the development of motor co-ordination and definite visceral organizations far more intricate and extensive fixed relations of mutual inhibition between reaction systems are developed. We have already seen that these specific and intricate inhibition relations are a factor in the development of all thought and are especially conspicuous in the growth of class names and abstract concepts. Nevertheless, there seems to be less tendency for merely *indifferent* reactions to be mutually inhibitory in human than in lower animal life. In other words, human behaviour is characterized by a more facile *synthesis* of various reaction patterns.

This is particularly true, at first, in regard to verbal activity. There are several obvious reasons for this. In the first place, verbal activity in its organization *lags* behind other activities. Its organization is not immediately forced by the environment, to the same degree. The child must learn definite motor organization in walking, or riding a kiddie-car, but he may talk as spontaneously as he chooses, *except in so far as his verbal activity is corrected in conversation and in participation with adults in overt activities.* Moreover, it must always be remembered that words have their origin in *oral play*, or lallen. Symbolic activity arises in an *autistic context*, characterized by fluctual implicit processes.

Because of the lack of fixed relations of mutual inhibition between symbolic patterns, kindergarten children are to a high degree insensitive to contradiction, or in other words, are quite lacking in critical faculty. There

is a facile and uninhibited flow of ideas. Everything joins to everything else in the child's thought. Judgments which would seem obviously inconsistent to an adult are fused, or "condensed", in the thought of the child. Six-year-old children at the Institute J. J. Rousseau, asked to match proverbs, never failed to respond; and when they were asked to explain the connection, innumerable reasons appeared with unbelievable felicity, even when the children hadn't understood the import of the proverbs at all. They caught various meanings and facilely but indiscriminately associated these meanings. When they were asked why the sun or the moon doesn't fall from the sky they merely enumerated associated relations, such as: "Because it is hot. It stays up." "Because it is yellow (bright)." "Because it lies in the sky." "The moon doesn't fall because it is very high up, and the sun isn't there." [1]

"The child (of kindergarten age) cannot choose between two contradictory explanations of the same phenomenon; he admits both and even fuses one with the other. This is not because of any conscious synthesis as though the child were in the presence of two terms first received as distinct and later condensed, but rather because of a lack of control, since the elements in an experience continually agglomerate with preceding elements." [2] One tosses a pebble in a glass of water and asks a child why the water rises. The answer is "Because it is heavy". One puts in a piece of wood. The water rises "Because it is light". Then sensing a difference in the two explanations the child instead of choosing between them, condenses them, "The water rises because the wood is a little heavy and a little light." [3] For children of this age, at least, "The truth is the whole". The neglect of the principle of contradiction leads inevitably alike in little children and profound philosophers to overfacile synthesis and unscientific logical theory.

But although in the naturally plastic and too frequently

[1] *J. de Ps.*, Vol. 21, p. 75. [2] *Op. cit.*, p. 87.
[3] *Op. cit.*, p. 88.

neglected thought life of the pre-school child there is a relatively slight degree of definite systematic knowledge or definite established contradiction, it would be a great mistake to say that the child at any age is " insensitive to contradiction " or " incapable of discrimination between concepts ". Piaget at this point makes the serious mistake of speaking of abstraction and contradiction as *originating* in the kindergarten period. The infant, we have seen, in the very beginning of symbolic activity, hesitates in the presence of a familiar situation ; he seeks the *habitual* word, the word that belongs in the specific situation. The development of the name question is, of course, a very clear indication of this discriminative attitude toward words. The inhibitions of symbolic activity remain for a considerable period *implicit* and *ineffective*, but it is a great mistake to neglect their reality.

The beginning of explicit *symbolic reinforcement* and *symbolic inhibition* of tentative behaviour is evidenced in the growth of the use of the affirmative and negative particles, *Yes* and *No*. The habits of the child, including symbolic habits, are from the beginning gradually more and more conditioned to the specific gestures and words of the parents. Definite positive reactions and definite inhibitions are gradually built up in social activity. " Yes " and " No " begin to be understood in the first year of symbolic activity as symbols of encouragement and inhibition. There are three stages in the development of " Yes " and " No " as symbols of confirmation and inhibition. The first stage is the conditioning of the child's behaviour to these patterns spoken by adults. The second stage is the use of the symbols by the child as instruments of confirmation or inhibition of tentative non-symbolic acts. The third stage is the use of the symbols by the child as the instruments of the confirmation or inhibition of symbolic reactions, as such.

The following anecdote illustrates the use of " no " as a symbol of inhibition on the control of unverbalized activity. A child of about eighteen months was warned

not to put her hand into a certain open chest and not to take out the things in the chest. The inhibition was clearly established but the original impulse was strong. For ten enormous minutes I watched with fascination the battle between the impulse and the inhibition, as the little hand reached forward toward the things in the chest and then withdrew to the verbal accompaniment " No, no, no ! " uttered by the child herself. Then the battle subsided, called to a close by the distraction of other interests.

This use of the inhibitory gesture " No " or the accessory gesture " Yes " is later transferred to the control of symbolic responses. Thus Stern observed the use of " Nein " by Hilde at one year and six months, either in inhibition of her own tentative reactions or suggested activities of her parents, but she did not apply it to verbal reactions until five months later. At 1 : 6½ in answer to the question, " Shall we take Hilde away ? ", she answered " No ! ", but in answer to the question, " Is this a wauwau ? ", when the wrong animal was pointed to, she merely remained silent or echoed " Wauwau ". Four months later she began to contradict a wrong name by substituting the right name, and two months later, at 2:0, she applied the " No " expressly to simple verbal judgments.[1]

Stern gives the following table of varying ages of the first use of Yes and No, according to records of vocabulary development in German children[2]:

	First Use of Negative Symbol.	First Use of Negative Symbol in Relation to Verbal Activity.	First Use of Affirmative Symbol.
Hilde Stern	1:6½	2:0	1:6
Günther Stern	1:7	1:8¾	1:8½
Eva Stern	1:4½	Uncertain	1:6½
Preyer	1:8	2:0	1:9
Lindner	Not recorded	1:10	1:6
Ament	1:8½	" 1:9 " (" So reported but falsely interpreted ")	1:10
Idelberger	1:2	1:6½ (Not yet developed where record stops)	1:6½ (Not yet developed where record stops)

[1] Stern, *op. cit.*, pp. 39, 56. [2] *Ibid.*, p. 237.

Alice Snyder has given the following characterization of the use of the symbol of inhibition, " No ", by a two and a half year old boy [1]:

(1) Its position at first is at the beginning or end of the phrase or sentence, but gradually becomes assimilated to its position in conventional syntax.

(2) Negative imperatives and statements of dislike are the most common type of negative.

(3) " Negative statements of fact " also appear, however. " These are most commonly startled out of the child by a sudden interruption of the familiar, by a failure of the expected to happen."

(4) Negative responses were frequently used in a purely arbitrary way, as " No, I can't say ' Uncle Harry ' ".

(5) A peculiar use of the negative is apparently typical of children of this age: the use of *antithetic statements.* (This has been noted by Preyer, Dearborn, Sully, Hogan, Tanner, Stern, Bloch, Delacroix, and others.) Examples given by Snyder, are:

" Not go out dat boat; go out big boat."
" Not dat boat hot; dat boat hot."
" Dat not pretty tight; dat pretty tight."
" Not put pipe in mouth; brother L. put pipe in mouth."
" Not go too far out; dadda and mother go too far out." [2]

This last trait leads to the establishment of a most fundamental structure in the evolution of rational intelligence: formal systems of logical opposites. Gradually various *terms* become established as *habitually involved in contradictory statements. The acceptance or rejection of one term of such a pair henceforth automatically operates to inhibit or reinforce the other term, respectively.* A few illustrations which Stern reports from Günther's conversation in the third year illustrate the emergence of

[1] Snyder, " Notes on Talk of a Two-and-a-Half Year Old Boy," *Ped. Sem.*, Vol. 21, pp. 412-24.
[2] *Ibid.*

such formal systems of opposition. Günther asserted, with emphasis, " I'm fast runner, not slow runner ". A milk pitcher was set awry on a tile. Günther noticed it, " Oh, crooked, father ! " It was righted, with the question, " Is it still crooked ? " Günther answered, " No, is pretty ! " A visitor said, " You're an old boy ", but Günther corrected, " I not old boy, new boy ! " Such terms become fixed in mutually inhibitory relationships which come to function quite as automatically as the mutually inhibitory adjustments involved in swallowing and in breathing.

There is, of course, nothing sacred or absolute about logical contradictories. They have their foundations in previous habits of thought, and are in need of constant revision and reorganization. The truth usually does lie *between* crude logical contradictions. Nevertheless, the principle that the affirmation of a statement involves the negation of its habitually-and-traditionally-established logical contradictory is the fundamental principle which makes possible the systematic exploitation of previously established knowledge (individual and traditional) in the control of new intellectual activity. Apart from systems of formal contradictions and logical opposities all systematic reason would be impossible. The fallibility of such systems, however, makes it necessary to give attention to their merely relative value and the necessity of the constant reconstruction.

At the same time, various explicit positive formulations of experience are being established as *fixed systems of reference and inference,* capable of use in the systematic exploration and definition of various phases of experience, and available as more or less automatic supporting principles in the control of reason. Every explicit formulation of experience, such as " Cows don't eat people ", " Teddy wants a yellow dress ", and " Brownies are tickly " may become a premise giving formal warrant to some new truth. The number, range and character of such available accepted statements, and the extent to which they have

been mutually reconstituted, related to more abstract formulations, and all rendered mutually consistent largely determines the rationality or the irrationality of any thinker.

VII. It would, however, be a serious mistake to assume that the growth of reasoning ability is wholly a matter of the organization of formal symbolic systems. Intellectual acumen cannot be equated with opportunities for the acquisition of symbolic equipment. Differences in rational intelligence seem to involve degrees of the *span of tension*, the capacity to correlate simultaneously numerous and intricate intellectual patterns, or ideas, and degrees of the *extent and complexity of symbolic equipment*, the previous symbolic organization of experience. It is, however, difficult and probably at present impossible to determine exactly the nature and the degree of interaction between these two factors. Some degree of independence would seem probable but considerable mutual dependence is clearly demonstrable. In infra-human animals intelligence, the capacity for the tensional adjustment of intricate conflicting responses, must be entirely a matter of innate capacity and natural maturation. But among human beings the span of tension depends in large measure upon the excellence of the formal schemata which have already been acquired and are, therefore, available for correlation. Other factors being equal, reasoning capacity tends to be proportionate to knowledge.

The variation of natural capacity for imagination may depend primarily upon the number of cerebral dendrites, or upon their arrangement, or upon some unknown factor such as " nervous energy ", or upon various combinations of such factors. Varieties of natural endowment obviously affect a person's span of tension at any given time, but this factor (in any measurable operation) is also dependent upon the second factor, the previous organization of schemata of implicit and symbolic thinking.

In the second place, the accumulation of symbolic organization is dependent upon such factors as attentiveness, interest, insight into significant relations, factors which are at least closely related to or identical with the first factor just discussed. On the other hand, factors determining facility and stability of conditioned reactions as measured by Krasnogorsky, Mateer and others are fundamental in learning but may be relatively independent of other factors involved in tensional correlation of intellectual patterns. Eventually the various physiological factors involved in intelligence may be successfully isolated and measured in human infants. It is, however, obvious that differences in *cultural milieu* have important bearings upon the extent and character of the acquisition of sensory and symbolic schemata, which in turn affect capacity for reasoning and insight.

Ruger found three types of intellectual analysis, in his study of efficiency in the solution of mechanical puzzles, representing three corresponding degrees of efficacy, namely the *perceptual*, the *sensory-imaginal*, and the *verbal-imaginal*. But he pointed out that words played an important part in building up the sensory schemata. " The verbal image does not always come after the factual but is used in building up the factual, the latter often being dragged in bit by bit and held by words until a total factual image has been built up. The complete factual image may then be superseded by a compact verbal statement." [1]

Unrecognized operation of symbols in solving a non-verbal problem is illustrated in an experiment by Warden. In general, it must be emphasized, the chief contribution of the acquisition of verbal activity to intellectual capacity is the provision of elaborate, formal schemata which make possible the systematic experimental treatment of situations not immediately present in perceptual experience. Nevertheless, the contribution of language ability to the solution of immediate non-linguistic problems is well

[1] Ruger, *The Psychology of Efficiency*, p. 138.

illustrated by the following experiment.[1] Forty persons were introduced to a carefully controlled maze experiment analogous to the type used in animal experimentation. Each person was seated in front of a table on which was a grooved maze with various blind passages. The maze was concealed from the sight of the subjects by a small screen, so they could not see what they were doing. Each person was given printed instructions to thread the maze with a stylus which was placed in his hand. He was instructed to continue until he learned to thread the maze from beginning to end without error. The number of trials required to learn the maze varied from 16 to 195. At the conclusion of the experiment each person was asked to report verbally whether his procedure was primarily worked out in motor adjustments, visual patterns or verbal organization. Seventeen reported that their reactions were primarily motor, that is, they relied upon the "feel" of the movements made, as one frequently does in fumbling with a key in the dark. These subjects required on the average 123·9 trials to learn the maze (ranging from 72 to 195). Eighteen reported that they relied primarily upon visual patterns, which they formed in their imagination. These subjects required on the average 67·9 trials (ranging from 41 to 104). Twenty-five reported that they relied primarily upon verbal organization. An example of the verbal organization is reported by the experimenter, who took a record of the audible whispers of some subjects: "Right forward and left forward, then right-forward three times, left-forward twice" and so on through the maze. The verbalizers completed the test on the average in 32·2 trials (ranging from 16 to 62). The experiment, incidentally, shows that purely motor tests may not eliminate the advantage accruing from verbal education and conceptual organization of experience.

Thirty of the forty subjects also took both Army Alpha

[1] Warden, "The Relative Economy of Various Modes of Attack in the Mastery of a Stylus Maze," *J. of Exp. Ps.*, Vol. 7, pp. 243-75.

and Thorndike Intelligence Tests. The individual range within the whole group (largely made up of graduate students) was small, but those who primarily used motor organization in the maze problem averaged distinctly poorest on both scores, the verbalizers averaged best, and the visualizers constituted an intermediary group as in the special problem score. This suggests a positive correlation between *habitual resort to symbolic activity* in problematical situations and *superiority of intelligence.*

Baldwin and Stecher report an analogous tendency in nursery school children in learning the card-sorting test. "The children were discovered to be developing an increasing memory of the position of the various designs. Individual children had their favourites which they quickly recognized and placed. Some of the children had names for the designs; one little boy called the swastika a 'jigger' and the Maltese cross a 'figger'. The association value of these words doubtless aided in the correct placing of the designs." [1]

The rôle of symbols in the organization of number concepts affords a good illustration of their function. But here, too, it is important to avoid the crass assumption that thinking is an isolated verbal process. Cunningham, in a very valuable recent study of *The Measurement of Early Levels of Intelligence,* states: "It must, of course, be recognized that a child may be intellectually capable of making number distinctions and combinations before he has acquired the number names by which we adults label the various groupings. Some of our bright children apparently failed to achieve success in certain unseen additions and subtractions merely because they could not give the correct name to the result, as, for example, when they indicated the answer by holding up the correct number of fingers. It is obvious from observation that a very young child can tell the difference between two objects and one object of the same kind, and probably three objects and two objects, before he has begun to

[1] Baldwin and Stecher, *Psychology of the Pre-school Child,* p. 73.

speak at all. It is interesting to observe from our results, then, that it does appear possible for correct mental manipulation to take place with such comparatively unlabelled number groupings—though we should not expect it to run very far ahead of the ability to name the groups. . . . Apparently the progress of most normal children is marked from about three years on by a rapid development of the grasp of conventional and fundamental number facts." [1]

The pre-verbal number recognition here described is of the type referred to in the previous chapter, as illustrated in the records of Decroly and Degand [2]: the ability to distinguish between two and three objects, or even between three and four objects—as when the little child is playing with three marbles and one of them is removed without the child's notice, but the child notes the difference and begins to hunt for the lost marble. Or the child may be asked to give up four pieces of candy to his teacher on the promise that they will be returned, and he may, before any verbal use of numbers, recognize the discrepancy if only three pieces are given back. However, there is one important theoretical consideration which Cunningham leaves undeveloped, namely, that these examples afford no convincing evidence of the explicit recognition of number *as number*, that is, as *discontinuous quantity*, but can be satisfactorily treated on the analogy of the discrimination of continuous qualities. If a long piece of candy is taken from the child and a short piece is returned, his reaction will be just the same as in the case of the three, or four, or five small pieces. It is possible that the only capacity here involved is ability to make discriminations of *more and less*, in varying degrees of acute perception. It is also possible for the child to take account of differences in the total manipulation-patterns used in playing with two objects and in playing with three objects.

[1] Cunningham, *Early Levels of Intelligence*, p. 23.

[2] See pp. 111-2, above.

Cunningham's researches reveal important differences between the capacities of children of various mental ages and idiots and imbeciles rated as having the same mental ages. The technique followed was the application to children of the CAVD tests developed by Thorndike from the study of adults, and, therefore, in the lower intelligence levels from the study of idiots and imbeciles, classified according to Stanford-Binet ratings. The CAVD tests are a composite of four types: Completions (for example, supplying missing word in such a sentence as, The . . . is barking at the cat), Arithmetic tests, Vocabulary tests, and tests of the ability to follow Directions (such as Make a cross inside the little square). Some very interesting results were obtained, which bear upon the distinction between the mere range of acquisition of symbolism, as revealed in a concrete vocabulary test, and the more intricate organization of symbolic structure and habits involved in the ability to follow directions, but the interpretation of these results would involve an elaborate digression. The material which bears most directly upon the immediate problem of the significance of symbolic structure for logical processes is afforded by arithmetic tests at the lowest levels, A, B, and C, of the CAVD scale.

The *children* showed marked superior ability in the following tests:

B1. Counting of two pennies (3 of 3 trials correct).
A8. Showing the biggest of three squares (2 of 3 trials correct).
A6. Showing the smallest of three pencils (2 of 3).
A7. Showing the smallest of three squares (2 of 3).
B4. Showing the biggest pile of pennies (13 in one, 2 in other, 3 of 3).
C4. Showing the biggest pile of pennies (10 in one, 5 in other, 3 of 3).

The *imbeciles* of apparently comparable ability showed marked superiority in the following tests:

D9. Adds unseen 3 plus 2 (2 of 3).
D1. Counts 15 pennies (3 of 3).
D6. Names 5 fingers when shown (5 of 5).
D7. Answers " Which is biggest, 3 or 1 ? " (2 of 3).[1]

[1] Cunningham, *op. cit.*, p. 59.

These results show that sheer length of experience tends to enable the imbecile to surpass in those tests which depend upon the acquisition of numerical systems which can be taught by drill, to a considerable degree, whereas young children who still lack this organization of symbolic systems may be superior in the perceptual discrimination of continuous quantities, where success depends primarily upon factors which are independent of the acquisition of symbolic processes. Differences in arithmetical ability are due in part to differences in acquired *number symbols*, in part to differences in *neural constitution*.

The growth of the capacity for problem solving and general intellectual development, as indicated by psychological tests, is in general closely related to the growth of the size of *general vocabulary*. This is indicated by a careful study of the size of vocabulary in young children in relation to age in years and intelligence scores, by Madorah Smith.[1] The vocabularies of the children over two were determined by the Smith Vocabulary Tests:

Average Vocabularies

Years.	Number of Children observed.	Number of Words.
1	52	3
1½	14	22
2	25	272
2½	14	446
3	20	896
3½	26	1222
4	26	1540
4½	32	1870
5	20	2072
5½	27	2289
6	9	2562

Partial correlations between the three factors of score in Stanford-Binet intelligence tests, size of vocabulary, and chronological age, the third factor constant, were as follows:

Between intelligence score and size of vocabulary .	·69±·03
Between intelligence score and chronological age .	·42±·05
Between size of vocabulary and chronological age .	·20±·05

[1] Smith, Madorah, *op. cit.*, 1926, pp. 54, 64.

Thus the relation between mere size of vocabulary (regardless of difference in organization) and general intelligence appears to be more intimate than the relation between size of vocabulary and age in months. Especially in the case of very young children, however, this test must be used with the greatest caution. A late beginning in verbal activity in case of children of more than average intelligence is by no means rare. A specialized auditory-vocal organization, already described, is involved in speech and this may be retarded in development while other factors are advanced. It must be emphasized, moreover, that such correlations prove nothing about the relation of the causal factors involved. In general, however, the evidence indicates that ability to learn and linguistic education are complementary factors which operate in the growth of intelligence, not by mere addition but by constant mutual multiplication.

The immediately preceding paragraphs may be summarized in the statement (which would have been a platitude fifty years ago): the growth of capacity to reason in the child is dependent both upon *innate factors* and upon the *acquisition of vocabulary and knowledge*, which is affected in high degree by the social environment; but the exact operation and interrelationship of the various physiological and environmental factors involved has not yet been satisfactorily deciphered.

But the further statement can also be made, which would have been quite surprising fifty years ago and is still unrecognized by many psychologists, that the development of even the *non-verbal behaviour patterns*, including *implicit schemata* of motor activity, is in part dependent upon linguistic education, which accordingly affects profoundly all reasoning habits, even in apparently non-linguistic performances. This has been indicated by the materials and discussions developed in the preceding chapters. Confirmation of this principle is afforded by the disturbances of sense of direction and perspective involved in certain types of aphasia, and the related

phenomena of mirror-writing and speech disturbance which sometimes accompany the attempt forcibly to change left-handed children into right-handed children.[1]

The whole intelligence-testing movement has been very seriously hampered by an inadequate appreciation of the rôle of linguistic factors in the development of intelligence. Without entering further upon this difficult problem, three primary implications of the study of the growth of language activity for the development of intelligence tests may be stated as follows:

(1) Most tests of intelligence at present in use are based directly upon the ability to manipulate linguistic and other symbolic schemata, as, for example, most of the Binet-Simon tests, and the Thorndike tests of CVAD (Completion—usually of symbolic patterns, Verbal ability, Arithmetical ability, and ability to follow Directions—mostly verbal directions applied to simple geometrical figures). These tests have a high intercorrelation, for they obviously measure the same thing, the capacity to reason in symbolic schemata. The thing that is measured by these tests is most fundamental for subsequent scholastic attainments, scientific achievement, and in a wide range of important social and industrial activities. Its exact relation to native endowment is, however, still highly problematical.

(2) Tests which are apparently entirely non-linguistic may nevertheless depend, to a considerable extent, upon non-verbal schemata of relationship, which have been previously affected by symbolic processes, and upon personality traits such as social co-operation, interest in test problems, and perseverance, which are to a large extent dependent, as will be shown later, upon specific symbolic education as well as upon the whole cultural milieu.

(3) Tests which are apparently non-linguistic perform-

[1] See the discussion of aphasia in Chapter II; also, Delacroix, *Le langage et la pensée*. Other references given in bibliography.

ance tests may be directly affected in unrecognized ways by verbal processes, as shown by Warden's experiment and the observations reported by Baldwin and Stecher.

In this connection, a research programme may be suggested in attack upon the problem of the experimental isolation of various factors involved in the growth of reasons, something as follows:

(1) Further development of the study of fundamental physiological factors, in different human individuals, especially children at different ages, along the lines of the work of Pavlov, Krasnogorsky, and Mateer;

(2) Further development of norms of development in infants, along the lines of the work of Blanton, Mary C. Jones, and Gesell; and the correlation of these studies with:

(3) Tests of symbolic intelligence of the same children at later periods;

(4) Performance tests; and

(5) The refinement of measurements of types of social environment.

I hazard the guess that the first and second methods mentioned above will supply data, within the next decade or two, for a considerable revision of the theory and methods of intelligence testing in the case of young children and as regards innate factors.

Fortunately it is less difficult to discover the main factors in the growth of reason which are subject to human control than to determine the exact interaction of these factors and their "specific gravity". These factors fall into several principal groups:

(1) *Hereditary factors controlling organic constitution and maturation processes.* At the present time an attempt to state these factors in detail is largely a matter of guesswork. It is possible that quite different factors, for example types of synapse structure, types of brain cell arrangement, and so forth, may have diverse implications for various intellectual capacities, such as facility and stability of conditioned reactions (learning), or capacity for correlation of ideational patterns (insight). Again,

such factors, if different, may be more or less linked in inheritance. In any case, it is certain that there is a high correlation between the natural intellectual endowment of parents and children.[1]

(2) *Fundamental physiological and psychological habit organization*, dependent upon nutrition, the co-ordination of motor systems, and co-ordination of interests, or emotional adjustments.

(3) The symbolic organization of all phases of experience, dependent upon the acquisition of *adequate vocabulary* and the free discussion of all interests.

(4) The *systematic intellectual organization of symbolic activity*, through participation in conjoint activities and rational discussion, involving the acquisition of systems of contradiction. The foundations of this essential process are laid in the pre-school period, but it is elaborated, corrected and reconstituted through an adequate programme of public education—including:

The acquisition of various useful *symbolic schemata*, such as number systems, chronological schemata, points of the compass, etc., and the extension of knowledge, and

The *integration* of the whole range of symbolic activities with the whole range of vital activities and implicit interests, which is the foundation of the growth of wisdom.

[1] Papers dealing with the measurement of total effects of nurture (including habit-training, emotional conditioning and symbolism) upon intelligence are presented in the 27th Year-book of the Nat. Soc. for the Study of Educ. (U.S.A.). On the basis of materials there presented, one might hazard the *estimate* that the superior family contributes from 5 to 20 points to the intelligence quotient of a child, above the rating which he would have been able to score if brought up in a mediocre home. See especially Freeman, Holzinger and Mitchell, "The Influence of Environment on the Intelligence, School Achievement, and Conduct of Foster Children, pp. 103-217.

CHAPTER VI

PHILOSOPHICAL THEORY

I. THE cardinal thesis of the present study has been formulated in the statement that the processes and organization of communication are continuous with other physiological and social processes, and that the evolving structure of intellectual activity (including the *forms* discovered in logical analysis) is a function of the total growth of life both prior to and subsequent to the rise of verbal activity. This statement involves no denial of structures prior to the evolution of organisms which we classify as living; on the contrary, it assumes that the history of such organisms is at no point discontinuous with more extensive and conditioning structures, which in turn may be conceived as dependent upon their total contexts. "The stablest thing we can speak of is not free from conditions set to it by other things." Natural structure is thought of as being differentiated from process by degree of relative stability, but as constantly undergoing reorganization in an infinity of processes including the process of thinking itself.

Mind has been defined as the most immediate context in which thoughts originate. Such immediate context of thinking is at first organismic, but its structure is conceived as continuous with all natural structure. Thus the structure of the world in which we live and about which we think, as reorganized in organic and social processes and especially in intellectual processes, constitutes the structure of mind. Thought as implicit tensional behaviour and mind as its immediate context are prior to linguistic activity. But thought is reorganized and mind is reconstituted through the instrumentality of linguistic

processes into human reason and logical structure. Reason is the specific instrument of our discursive species; and logical structure is at once the product and support of rationality.

Formal logic, as a classification and exposition of standardized types of statement and inference used in elaborate controversy and scientific demonstration, may be developed to a considerable extent apart from any analysis and criticism of the whole movement of thought. The constant expansion and interpretation of systems of formal and symbolic logic give ample evidence of this. Nevertheless, any such science of a circumscribed segment of reality always presses against its artificial limitations, seeking more adequate orientation, the correction of inherent inconsistencies, and the grounding of "first principles" in related fields of study. Thus the profound student of logic is necessarily led into the study of psychology and metaphysics. The comprehensive study of the nature and modes of reasoning must necessarily utilize the most adequate statement possible of the nature of symbolic processes and the relation of modes of reasoning to the structure of such processes.

The conception of *pre-logical mentality*, as employed by Baldwin, Lévy-Bruhl and Piaget, is the natural counterpart of artificially constructed systems of logical theory. Acute psychologists in the study of the thought-life of children and primitive peoples, sensing the inadequacy and inapplicability to their fields of the traditional formulations of the modes of human intelligence, have been beguiled, quite naturally, into the formulation of an equally artificial and mysterious "pre-logical mentality". The confusion involved in this absolute antithesis between pre-logical and logical mentality is dissipated by the recognition of the character of pre-symbolic intuitive modes of intelligence and the rôle of symbolic processes and abstract schemata in the processes of formal inference.

The contrast in degree between the mentality of primi-

tive and civilized peoples is striking enough and very important in understanding varieties of institutions and cultures, but the contrast is easily exaggerated. The intellectual modes of the so-called primitive peoples have never been formalized by written composition, by leisure class dialectic (maintained by elaborate economic organization and stimulated by culture conflicts), or by the systematic organization of knowledge by professional classes of scholars and scientists. Therefore, the thought of such peoples is much more concrete and intuitive than the thought of educated Europeans. Nevertheless, it must not be forgotten that these people are also heirs of the symbolic accumulation and organization of vast ages of human conversation and conjoint activity, and utilize formalized abstract schemata to a considerable degree. Primitive man possesses mental schemes and physical contrivances which could be described as diagrams or formulas. " Methods of indicating the main points of the compass, arrangements of stars into constellations, coordination of these with the seasons, naming of moons in the year, of quarters in the moon—all these accomplishments are known to the simplest savages. Also they are able to draw diagrammatic maps in the sand or dust, indicate arrangements by placing small stones, shells, or sticks on the ground, plan expeditions and raids on such elementary charts. . . . All such diagrams are means of reducing a complex and unwieldly bit of reality to a simple and handy form." [1]

The distinction intended by the terms " pre-logical " and " logical " is more accurately described by the terms " hyposymbolical " and " symbolical ". It must be recognized, of course, that all persons who converse are, in varying degrees, linguistic in their modes of thought, and that symbolic activity never replaces the operation of pre-symbolical processes, but supplies structures in

[1] Malinowski, " Magic Science and Religion," in *Science, Religion and Reality*, pp. 34-5.

part new, in part the explication of prior implicit processes.[1]

II. If the expression *Laws of Thought* is intended to mean the most fundamental principles of the organization of intellectual activity, and if the principle of continuity is accepted, it would seem natural to search for such principles in the structure of the most elementary organismic processes.

The *transmission of excitation* has been described as a fundamental pattern of organic behaviour. Similarly, a tissue immune from a particular type of excitation-transmission may be said to *inhibit* this transmission. Ultimately *implication* would seem to be rooted in excitation-transmission, and *negation* in inhibition. *Whenever an element p in intellectual processes functions as a stimulus to another element q in the same plane of behaviour, p may be said to imply q* (or, to have a transitive relation to *q*). In general, whenever a tentative intellectual-pattern (idea) *P* is effectively reinforced in the experimental processes of intelligence, it may be said that *P* is organically *affirmed*. On the contrary, whenever a tentative intellectual-pattern *Q* is effectively inhibited on the plane of intellectual experiment, it may be said to be *rejected*. The operation of physiological alternatives, typified on the lowest level by such tropisms as " attraction " and " aversion " to different stimuli, seems to be a fundamental feature of physiological processes. Any

[1] A third " hypersymbolic " stage might be recognized (corresponding to Baldwin's " hyperlogical " stage) in highly imaginative and emotional thinking, in which acquired structures are operative in a very subordinate capacity but are largely overwhelmed by implicit processes. However, such a usage does not seem to me to be desirable, because it suggests an uncritical appraisal of the value of all so-called " hypersymbolic " thought, without the requisite distinction between thinking which is richly imaginative, so as creatively to supplement established modes and controls of reasoning, and an inferior or infantile type of thinking, on an emotional plane, which may be substituted for the more disciplined modes of truly rational judgment. Moreover, it carries the suggestion that in the most creative type of thinking, rational structure is wholly transcended, and this hypothesis is certainly unwarranted.

animal investigating a situation hesitates between alternatives. The way in which this trait is developed into the structure of logical *contradiction* has already been described.[1] Thus the structures of *implication, negation* and *contrary alternatives* seem quite clearly to be grounded in pre-symbolic functions, although they receive a new organization in symbolic processes. Similarly, in the "delayed reaction", involving the tensional adjustment of implicit response-patterns, in which patterns with certain features are *rejected* and other patterns are *integrated* in the final response, there seems quite definitely to be the organic foundation of the logical principles of *analysis* and *synthesis,* which function as complementary aspects of the process of the logical integration of life. The schematic interaction of analytic and synthetic processes has been shown to be fundamental to the organization of the symbolic structure of numerical systems.

However, the founders of formal logic were primarily concerned not with an analysis of the fundamental principles of organic activity, but the underlying principles of the explicit, symbolic organization of thought; it is, therefore, these latter principles which are represented in the traditionally formulated "Laws of Thought": Identity, Contradiction, and the Excluded Middle. These might be more accurately described as the *laws of the transition from the pre-symbolic to the symbolic structure of intellectual activity.*

It is not difficult to see that the Principle of Identity (A is A), which has no specific functional significance on the level of pre-symbolic intelligence, is absolutely fundamental in symbolic activity. The validity of inference is destroyed when terms are used with shifting reference. The principle may be stated thus: *A symbol must have a constant reference within any set of related symbolic processes.*

The Principle of Contradiction (A is not not-A) is

[1] See Chapter V.

capable of interpretation along similar lines as a principle of symbolic activity: *In valid inference a symbol cannot be used interchangeably with another symbol which has a different reference.*

The Principle of Excluded Middle is dependent in any particular instance of its operation upon the previous opposites. The origin of such systems of logical opposites has already been described in Chapter V. The validity of the operation of the principle of excluded middle (A is either B or C—where C is identical with not-B) is dependent upon the degree of the validity of the particular set of terms in relation to the particular subject in question. Practically the principle of Excluded Middle is one of the most important principles of systematic thinking. The immediate recognition that the rejection of one principle involves the acceptance of its alternative in behaviour is a foundation of decisive action and of accurate and consistent thinking. It is equally obvious that this principle is imperfect and fallacious. All refined intellectual processes involve the superseding of traditional and previous dilemmas and fixed alternatives. Everett Dean Martin has well said that a thinker may be judged by the dilemmas he has outgrown.[1] There is a " Logic of the Included Middle " which is more adequate than the rigid formalism of the " Logic of the Excluded Middle ".

Bogoslovsky has defined four principles of such a Logic, as follows:

(1) An A must never be used separately from its non-A. (The Principle of Polarity.)

(2) The pairs which determine which aspect of a concept is put into operation must be explicitly expressed. (The Principle of the Partial Functioning of Concepts.)

(3) Efficient thinking must start with an assumption of continuity in potentiality and work for its actual realization. (The Principle of Continuity.)

(4) The quantitative value of any unit of thought must be explicitly indicated, preferably in terms of objective continuum-

[1] Martin, *Meaning of a Liberal Education.*

scales between the two poles of the opposites. (The Principle of Quantitative Indices.)

The practical value of these normative principles will doubtless be best understood by seeing in what the violation of each of them results.

The violation of the first principle leads to meaninglessness; for instance, to deprive egoism of its opposite, altruism, and say that all human actions are egoistic, practically robs the term egoism of all its meaning. To restore it, we are forced to introduce various modified egoisms opposed to each other—narrow and broad, social and anti-social, desirable and undesirable, and so on.

Neglect of the second principle results in ambiguity, as may be illustrated by the use of the word "natural", which, if used by itself, may mean "in accordance with laws of nature" (opposed to supernatural), or "common" (opposed to unusual), or "simple" (opposed to fanciful), or "normal, proper" (opposed to perverse).

Unwillingness to follow the third principle results in a hopeless deadlock in reasoning or in argument. Arguments as to whether experience is an active or a passive affair, whether playing tennis is physical or mental activity, whether human beings are products of heredity or of environment, whether mathematics is a practical or a theoretical discipline, and so on, are obviously endless, unless the answer "both" is accepted.

Neglect of the fourth principle leads to utter confusion and inefficiency. Merely to say that carrying a piano, as well as memorizing a poem, was both physical and mental activity, without further modification, would not be very enlightening. To describe Socrates and a professional gambler as persons both honest and dishonest without any indication of the proportion of honesty and dishonesty in each case would hardly help to encourage honesty and combat dishonesty.[1]

Bogoslovsky goes so far as to say that reasoning always proceeds in a choice between two alternatives: "There are many reasons for thinking . . . that in reasoning at any given moment only one comparison, one choice between two possibilities takes place. . . . This agrees with Dewey's description of the origin of thinking, 'Thinking begins in what may fairly be called a forked road situation, a situation which is ambiguous, which presents a dilemma, which proposes alternatives.' . . . Generally speaking nothing can become an object of our cognitive

[1] Bogoslovsky, *The Technique of Controversy*, pp. 17-18.

experience if not contrasted with its opposite. Thus we can formulate the first principle determining reasoning in the following way: *No concept, no judgment, no unit of thought has any meaning or logical value without its opposite,* or in other words, *No units of thought exist and function otherwise than in pairs of opposites.*" [1]

It is somewhat surprising that Bogoslovsky does not seem to have applied the Principle of the Included Middle to the propositions laid down in the last paragraph. If such an experiment were carried through, in the light of previous discussions in the present study of the growth of reason, the resultant statement might be something as follows: Every concept, or judgment or unit of thought involves the emergence of one particular implicit behaviour pattern, or idea, against physiological inertia, interference and inhibition, which frequently include one specific outstanding alternative pattern or logical opposite. The symbolic statement or explication of such alternative ideas, as " opposite concepts," clarifies the issues involved in the judgment process. When such explicit statement of opposite concepts, involved in any judgment process, has been achieved, however, refined judgment generally locates the most acceptable solution of the problem at some definite point on a continuum-scale between the two poles of the opposites. It will immediately appear that the change here proposed merely affects the psychological framework of Bogoslovsky's theory but leaves its essential thesis intact. Indeed, Bogoslovsky's doctrine, worked out in relation to a wealth of concrete material of actual scientific procedures, constitutes one of the most incisive and valuable contributions of the present epoch to logical theory.[2]

III. The distinction between *inductive* and *deductive* reasoning has long been recognized as problematical. It

[1] Bogoslovsky, *The Technique of Controversy*, pp. 117-18.

[2] I may state, for whatever it may be worth, that since reading *The Technique of Controversy* I have found myself employing its canons with distinct aid and advantage.

is now fairly well agreed that " Induction and deduction are not two kinds of reasoning which are quite distinct and independent of each other." [1] In all inference there is the operation of general principles of control, explicit or merely organic, or in other words the operation of " leading principles ", which constitutes the essence of deductive reasoning, in its generic sense. Also, in all inference, there is a development of new patterns capable of future operation in the control of concrete experience—for example, if I " deduce " the statement that " Socrates is mortal ", I may use this statement in the future as a " leading principle " in the control of particular problems, as, for example, if I were trying to persuade Socrates of the importance of giving heed to family property. The invention of principles capable of general application is the essence of inductive reasoning, in its generic sense. Thus, any typical inference would appear to have both inductive and deductive traits, in varying degrees. But although induction and deduction are not two entirely distinct kinds of reasoning, it would be a mistake to say that they are not two different kinds of reasoning at all. Kinds of reasoning follow the principle of physiological gradients; they emerge continuously from one another; but it is a fallacy to interpret this fact as implying that reasoning has a single structure.

When the study of the nature of symbolic activity is applied to the problem of the relations of induction and deduction, the scholastic terms take on added significance. *Inductive inference* is inference which *" leads into " new symbolic structures*, capable of further application in the control of new problems. On the other hand, reflective treatment of new problems in which the dominant control of the thinking is exercised by previously formulated statements is typically deductive thinking. *Deductive inference " leads from " previously formulated symbolic structures* in the treatment of new problems.

IV. Habitual symbolic structure is developed, in the

[1] Creighton, *Introductory Logic*, p. 386.

case of each individual, through systematic reorganization, with more or less mutually consistent implications, and convenient types of logical contraries, and, moreover, this whole evolution is controlled by a social structure which is the product of *infinite series* of such *systematic reconstructions of experience.* Therefore, the logical confirmation of opinions is the supreme instrument of wisdom. It brings with it the authority of the whole system of previous knowledge, in so far as this system has been rendered *self-consistent.* This is at once the beauty and the terror of logic. It explains why logical truth comes as an all-or-none experience. It exhibits the reason of its value. At the same time, it reveals its limitation.

The neglect of logical consistency in thought cuts off the individual from the benefits of the product of past intellectual labour, and the sustaining discipline of the community of interpretation. It involves, in varying degrees, maladjustment and disorganization of personality and irresoluable social conflict. The experience of to-day belies the ideals of yesterday, and the plans of to-day are thwarted by the events of to-morrow. Life becomes worry and confusion. On the other hand, mere logical consistency is worthless apart from the relevancy of concepts to the immediate and genuine interests of life. Cut off from the invigorating effects of fresh formulations of non-symbolic experiences, it becomes decrepit and falls an easy prey to self-deceit and confirmed prejudices. It is apparent that judgment becomes systematic at the cost of becoming limited and artificial. Organic experience affords truth in degrees; it is an affair of intent, doubt, and faith. Logical inference fixes *absolute truth* and absolute error, but *within a relatively artificial scheme of reasoning.*

It is obvious that *conventional truth* comes to us with the warrant of innumerable persons and of inconceivably more experiments than we shall ever personally experience; but, on the other hand, it is clear that most of these people lived in a more primitive stage of civilization,

that in each generation they, too, accepted most of their truth from their ancestors, and that most of the experiments which they performed were very clumsy and carried out without critical method. The intellectual health of the community is dependent upon the development of individuals who will not neglect the tradition and science of the community, and so live erratic and ineffectual lives, nor slavishly follow the established codes of truth, ignoring their own experiences of those intuitive apprehensions which constitute the ultimate source of the traditional truth.

Philosophers in general have tried to carry water on both shoulders. They have sought, on the one hand, to establish truth as something absolute, an all-or-none affair, systematic and scientific. On the other hand, they have sought to establish truth as a vital affair, immediately relative to the interests of the heart. Russell, it is true, has frankly identified philosophy with logical and systematic truth, at the cost of regarding it as irrelevant to most human interests, but few have been willing to make such a complete concession. In general, idealistic philosophers, on the other hand, cling to truth as organic, and try by a transcendental *tour de force* to drag in the absolutism of universal logical structure. Neither realists nor idealists have recognized frankly the relation of logical truth to intuition. Both fail to recognize fully that systematic inference has the highest validity in rational activity, and exercises this prerogative in virtue of its essentially artificial and vicarious character.

The recognition of *truth, as such,* constitutes an added moment in thought. It lies, in a logical sense, outside the judgment which it validates, in a second reflective judgment which includes the primary judgment together with an inclusive situation in which it is recognized as coherent. This point is emphasized by Dewey, in an essay entitled "The Experimental Theory".[1] The situation which

[1] Dewey, *Influence of Darwin on Philosophy and Other Essays,* pp. 77-111.

Dewey has particularly in mind in this essay is the case of a primary *pragmatic validation.* " An experience is knowledge, if in its quale there is an experienced distinction and connection of two elements of the following sort: one means or intends the presence of the other in the same fashion in which itself is already present, while the other is that which, while not present in the same fashion, must become so present if the meaning or intention of its companion or yoke-fellow is to be fulfilled through the operation it sets up." This would, however, seem to represent only one possible type of truth experiences, although the fundamental type in the growth of the child's knowledge. In behaviouristic terminology it is a definition of truth in terms of " anticipatory " and " consummatory " reactions. But another type of truth may be described in terms of " tentative " and " accessory " reactions. And it is this latter type of truth which is characteristic of later mature logical judgments. The recognition of truth in the latter case is still a logical step beyond the judgment itself; it involves an added factor of reflection. But it does not necessarily involve a new *temporal* factor. In the first truth-judgments of the child it is apparent that a new temporal factor is involved, because the child does not have a span of correlation or a development of logical organization adequate to carry the added abstraction of the second moment of validation within the tension of the original judgment situation; accordingly, the new recognition must be serial; it must follow as an experience of the consequences, in a new situation, of a judgment defined in a previous act. But with the development of intricate logical organization, there comes the capacity to suspend judgment during a process of intricate examination of its relations and to discover the explicit warrant of a judgment in the structure of previously acquired knowledge *within* the temporal span of the judgment process.

Knowledge may be defined as *an organization of symbolic activity* accepted as an adequate *representation* of the

experience which it formulates and an adequate *instrument* of control in future behaviour and especially in future reasoning.[1] As such, knowledge is intermediate between old insights and new insights. It is constituted by selected formulations of human experience, built up and rendered available for the control of new suggestions.

Science lies beyond both *pragmatic truth* and *logical truth*, as these two types have been defined in the preceding paragraphs, because it is an *integration* of the two. Historically, the resort to systematic overt experimentation has developed in relation to and as an outgrowth of systematic dialectic. Questions needed to be formulated and critical interest aroused in their solution before they could be "put to nature". To-day the progress of experimental discovery and the progress of systematic formulation proceed *pari passu* and are mutually sensitive and interdependent. Ideally, scientific truth rests upon empirically validated hypotheses and their systematic elaboration according to accepted logical canons. Practically, of course, it includes a large mass of "common-sense" assumptions and hasty generalizations. It stands, however, frankly open to challenge at any point, subject to revision in the light of more adequate and exact observations and experiments and capable of systematic reconstruction. The fact that scientific theories change has sometimes been pointed to as a scandal. On the contrary, the fact that scientific theory is constantly undergoing restatement, not revision through mere cultural shifts but the revision through refined processes of analysis, experimentation and systematic interpretation, is the sole guarantee of its validity. Moreover, there is nothing surprising in the fact that the mathematical elaboration of formal schemata and the treatment of simple mechanical phenomena has proceeded more rapidly than the treatment of such intricate things as the structure of protoplasm, the relation of light to gravity, and the

[1] For discussion of the distinction between representative meaning and instrumental meaning, see Chapter III.

principles of human social organization. Science is necessarily an elaborate structure, whereof only the formal elements are absolute (and they are absolute only because they are merely formal), but wherein are varying degrees of "more exact sciences" shading off imperceptibly, through "less exact sciences", into the realm of mere current opinion ("common sense") and loose speculation.

Philosophy, in so far as it is scientific, lies beyond science —but only in so far. Academic philosophy is largely a distinct discipline which proceeds by the reinterpretation of selected systems of thought in relation to the prejudices and the creative insights of the interpreters. It is usually characterized by a rather half-hearted interest in the progress of current science and social experiment —an anxiety to "reconcile" philosophy with the new finds of science, and to direct social experiment "constructively", rather than an eagerness to increase in wisdom through the contributions of experimenters and statisticians and to evaluate accurately all factors in social life. The love of wisdom, on the contrary, in so far as it is scientific, goes beyond science in the *wider integration* of more or less systematically validated theories with one another and with intuitive insights and the subtle play of appreciation and desires. The interpretation of past and current systems of thought becomes one phase of this task.

In so far as the aim of philosophy may be described as the discovery of truth, its "truth" must be recognized as organic in contrast to the more exact types of pragmatic, logical and scientific truth, defined above. It includes in its treatment the processes of systematic truth, but its own organization involves the interpretation of theories in relation to implicit processes and interests and the modes of prescientific intelligence. This discussion leads into the problem of the distinctions between "truth" and "value", and the consideration of the relation of theories of value to theories of existence.

V. A value may be defined as *the formulation of an intention*, or of a factor or pattern within intention. Here is it crucial to remember that intention is a response gradient, gradually emerging out of total organic response as a distinct and controlling pattern. All primitive judgment is implicitly valuational. The emergence of relatively isolated " existential judgments " and the emergences of relatively pure " valuational judgments " are concomitant processes. Only as explicit schemata become organized in relation to symbolic activity can there be any interest in the determination of truth as such—or, in other words, can " truth " become a " value ". A similar advance in capacity for intricate symbolic statement is involved in the discussion of the accuracy or inaccuracy of statements of interest, *i.e.*, the application of the criteria of truth and falsity in judgments about values.

It is somewhat disconcerting to find so modern a writer as Ralph Barton Perry in so suggestive a book as his *General Theory of Values* taking as a text, in his treatment of The Relations of Interest and Cognition, the following intellectualistic quotation from Spinoza: " Modes of thinking, such as love, desire, or any other of the passions, do not take place unless there be in the same individual an idea of the thing loved, desired, etc. But the idea can exist without the presence of any other mode of thinking." [1] The first statement is false, if by *idea* one means a consciously recognized item of experience, as is overwhelmingly evidenced in the literature of abnormal psychology. The second statement is equally false on any modern interpretation, although in dealing with purely technical problems the particular set of intellectual processes in operation may be relatively isolated and unaffected by any other organic process—just as any set of reflexes may be relatively isolated from the totality of behaviour.

The doctrine of the existence of cosmic " patterns ", or " purposes ", or *forms*, to use the Aristotelean term,

[1] Perry, *General Theory of Values*, p. 306, n.

which are the supreme factors in the harmonization of life processes is frequently expressed among metaphysicians as the doctrine of Eternal Values. Such a doctrine would not be, so far as I can see, inconsistent with the thesis of this study if such patterns were interpreted as *continuous* with the whole context of natural processes. Neither, so far as I can see, does the present thesis lend it any support. In any case, however, such cosmic patterns would have to be distinguished from " values " in the sense of the formulated immediate motives of life—which are largely determined by specific physiological and cultural factors. As Spinoza said, if " purposes " are ascribed to God it must be recognized that they cannot be identified with the " purposes " of human life any more than the star called " the dog " can be identified with the barking animal that is called by the same name.

The treatment of values and existence as exclusive and independent realms is not a peculiar foible of the metaphysicians. It is a favourite device of scientists who speculate on method, especially among social scientists. The typical sociological doctrine on this theme is represented by Sorokin's discussion of Sociology and Ethics in the recent collection of essays on The Social Sciences and their Interrelations, edited by Ogburn and Goldenweiser :

" Scientific law which *describes* the existing relations among phenomena, and moral law, which *prescribes* a definite form of conduct and *valuates* the phenomena as good or bad, moral or immoral, are laws quite different and do not have logically anything in common. Similarly, as poetry represents a kind of social thought quite different from science, judgments of valuation represent a kind of social thought quite different from the scientific judgments. Similarly, as there is neither scientific nor non-scientific poetry, there is neither scientific nor non-scientific ethics. Each of them, poetry, science, and ethics, has its own criteria of valuation. To try to measure them with the same criteria is no better than to measure a distance by the unit of weight, and *vice versa*. If this point is clear, then it is very easy to distinguish scientific statements from ethical evaluations wherever they are given. Their mixture is logically inadmissible. . . .

" Psychologically, moralizing considerably hinders an objective

study of the real situation and leads to partiality and one-sidedness. Factually, in the majority of the cases it remains still purely metaphysical, not being based on a really scientific scrutiny of the corresponding facts and their casual relations. Under such conditions a moralizing sociologist is no *better* leader of the social reconstruction movement than a medicine-man of the past or a speculative ethicist." [1]

The development of commonly accepted (" objective ") canons of social experimentation, observation and report, and the " objective " elaboration and organization of commonly accepted data, as for example in statistical correlations, can be made to play an increasingly important rôle in the development of social theory. Such activities may properly be designated by some special term, such as " the purely objective (or mechanical) phases of social science ". The integration of such materials, however, in relation to their multiple implications and their application to the concrete problems of human life necessarily involves " subjective " elements, and reaches its highest pitch of excellence when the mastery of a wide range of exact, detailed material is combined with a high capacity of artistic imagination, viz., when the " objective " phases of sociology and " speculative ethics " are " mixed ", on the highest possible levels.

Intentions and values are capable of just the same experimental study and objective statement as any other set of facts. Motives do not have their sole being in an inaccessible realm of pure spirit. Genetically they may be found emerging as specific behaviour patterns in the evolution of organismic intelligence. It is granted, of course, that intentions and interests, being implicit patterns in the most transitional and creative processes of human life, are peculiarly elusive and obviously incapable of complete or final formulation. But it is important to recognize that the distinction between relatively objective sciences, determined largely or wholly by generally accepted canons, and relatively speculative theories, in-

[1] *The Social Sciences*, Chap. XXV., " Sociology and Ethics," by Pitirim A. Sorokin, pp. 312-313, 316. (Italics mine.)

volving a high degree of imaginative synthesis, is a distinction which cuts across the distinction between statements of values and statements of (other kinds of) facts. The distinction between relatively objective and relative subjective theory falls *within* social sciences, between the treatments of major types of human constitution and activity (which are capable of fairly objective statement) and the treatment of the more intricate and changeable aspects of human experience. Examples of the more objective type of social theory are supplied by the legal formulation of types of "interest", the elaboration of principles of economic processes, the formulation by the psychologist of dominant types of human motive such that their neglect or conflict tends to cause insanity, the anthropologist's account of the diffusion of specific culture patterns, the educational expert's analysis of the effects upon general intellectual development of certain selected classical studies, and so forth,

This suggests the conception of *ethics* as theory of social and personal adjustments, objective in varying degrees—in some aspects approaching the purest objectivity of exact science, and in other aspects passing into purely imaginative syntheses of values in artistic experience. The symbolic exposition of personal intentions, social values, and various possibilities of personal and social conduct affords the logical structure of artistic living.

The political corollary of this conception of ethical theory is the *conference method* of approach to social problems, in which possibilities of conduct are systematically *elaborated* and new syntheses of social interests are *created* which preserve the most intense and persistent interests which are operative among conflicting groups.[1]

VI. The metaphysical development of the Principle of Continuity, accepted and developed in the present study, leads to the doctrine of a *logical continuum* between

[1] See Follett, *Creative Experience*. Also Chapter VII below, Canons 7 and 8, for further elaboration of suggestions offered in these paragraphs.

statements and *things which are relatively independent both of social organization and of personal experience.* This conception is indebted to Hollingworth's theory of the *psychophysical continuum,*[1] but is somewhat differently developed. If personal experience is conceived as a controlling *focus* of various aspects of existence, some of which undergo profound reorganization in the process of any particular organic activity itself, while other structures and processes are relatively unaffected by such reorganization although they may condition and control it in varying degrees, it is possible to conceive a logical continuum between the *relatively active* or *subjective* aspects of experience and *relatively passive and independent* items.

Symbolic activity has been described as originating in an interaction between the activity of an organism (focused in its intellectual processes) and environmental processes (including the social environment). Therefore, the structure of symbolic activity must in part reflect the structure of the controlling active phases of organismic activity (*functions*) and in part the obtrusive features of the environment and their independent order and structure (*substances and external relations*), although it is assumed that these are ultimately interdependent.

Concepts descriptive of the first of these types of symbolic structure correspond at bottom, I think, to the category that is variously recognized in Buchanan's *parameters,* Cassirer's *concepts of function,* in Johnson's *determinants,* and in Sapir's suggestion of *relation* as one pole of the organization of concepts. According to the present account, these functional structures would be in part physiological structures prior to and independent of verbal activity and in part the acquired modes of symbolic organization. " For the modes in which words are combined—which constitute the subject-matter for Grammar —cannot be expounded or understood except as reflecting the modes in which thoughts are combined; and this combination is effected by means of such logical opera-

[1] Hollingworth, *The Psychology of Thought,* pp. 168 ff.

tions as negation, conjunction, alteration, implication and so on, represented by the words *not, and, not both, or, if,* etc." [1]

Furthermore, the operation of symbolic activity constantly modifies and reorganizes both the functional structures of individual organisms and the structures of the environments. One of the most conspicuous features of this operation is the evolution of symbolic structures in the individual and of languages and cultural institutions in the race. These, in turn, impinge upon the reorganization of symbolic activity. Thus symbolic activity is conceived as being itself continuous with more or less independent environmental structures and processes (more or less " independent reals "), and as containing within its own organization a logical continuum between items recognized as more or less representative of organic functional structures and relatively independent reals and their interrelationships.

These suggestions are, in part, reminiscent of the Kantian thesis of the *a priori* forms of thought. It suggests that schemata, or patterns, which are logically prior to concepts, are operative in conceptual thought as its sustaining principles, although such forms are not here treated as absolute in themselves, nor fixed for all rational beings, or even for all stages and conditions of human life. A specific difference, immediately apparent, is that the description here given of these schemata, or forms, is not limited to the two forms of time and space.[2] In fact, the suggestion might seem to be warranted that " space " is not a unitary schema but is a compound of " extent " and " direction ", and that " extent " is more closely allied to " time " or " transition " than to direction, but this is rather dubious in itself and aside from the main

[1] Johnson, W. E., *Logic*, Vol. 1, p. xxiii. Johnson's approach differs from the approach in the present study, of course, fundamentally because of the dualism of the former, and the neglect of the operation of symbolic processes in the organization of ideas. Cf. section above on The Laws of Thought.

[2] This point is also clearly made by Cassirer and by Buchanan.

point. A second difference between this suggestion and the Kantian thesis, even more fundamental, is that the forms of experience are not here conceived as irrelevant to the structure of things, so that the artificial problem of how they can be gotten together in experience is not involved.[1] The forms of human experience are expressions of things in their organic relation to human life. Life is a focus of nature.

The metaphysical theory in which all this argument seems to culminate might be appropriately labelled *Experimental Realism.* It is founded upon the empirical method and the principle of continuity. On the one hand, it is distinguished from the type of Idealism which states that " All is mind ", or lays down such an *a priori* criterion of philosophy as the following: " The great and ultimate test of a philosophy is its ability to unite with the belief in a perfect and timeless reality." [2] On the other hand, it is distinguished from current types of Realism which begin with the assumption of isolated structures, such as space and time (or space-time), absolute logical structure, and isolated fragments of experience such as " sense data " or even " individual wholes ".

Logically, Experimental Realism is akin to the Logic of Hegel and the Speculative Philosophy of Bosanquet in its emphasis upon the principle of continuity. It differs from such idealistic systems in that they *begin* by accepting as absolute one side of the old dualism between mind and matter and from *thence* work toward an inclusive and naturalistic monism, but are characterized throughout by a strong bias toward unity, absolutism, and imperialism. Experimental Realism is naturalistic at the start, accepts the *plurality* of experience as no less profound and pervasive than its *unity*, and develops its canons of criticism tentatively with no assertions of finality. Nevertheless, Experimental Realism has much in common with the

[1] This seems to be flatly contradicted by Cassirer, but is, I think, consistent with Buchanan's treatment in *Possibility*.

[2] Bosanquet, *Logic*, Vol. 2, p. 269.

type of " Speculative Idealism ", represented by Hegel, Bosanquet and Creighton, although it has very little in common with the " Mentalism ", defended by epistemological arguments, represented by Berkeley, Kant, Fichte and Royce.[1]

The nature of Experimental Realism, as here understood, can be exhibited by comparing it with Neo-Realism, specifically by contrasting the empirical treatment of the emergence of *things* in the child's thinking (together with the discussion of their later modification in mature reflection) and Whitehead's treatment of *events*. The work of Whitehead is clearly an attempt to overcome the discontinuities of realist theory, first to exhibit the continuity of " events " conceived as extensional structures, then to discover a continuity between these " events " and " eternal objects " and " physical objects ". The construction is exceedingly ingenious, but in its second aspect the whole procedure seems to me to take on something of the character of an attempt " to put Humpty-Dumpty together again ". In many ways the account given by Whitehead of an " event " is so much like the original apprehension of a thing in the genesis of conceptual thought that one wonders if the theoretical construction may not be modelled upon the actual genetic process. But here the peculiar status accorded time and space by Whitehead destroys the identity and seems to me to give an artificial character to " events " and to engender a new problem impossible of solution, namely, the relation of (other) qualities to pure time-space " events ".

The analogy between the empirical account of the apprehension of things developed in the preceding chapters and the account of events developed by Whitehead lies in the original *concreteness* attributed to knowledge in both accounts. Both specifically differentiate between the original apprehension of *transition* of events in raw experi-

[1] Cf. Creighton, James E., " Two Types of Idealism," in *Studies in Speculative Idealism*—an essay which should be read and re-read by all who profess philosophical idealism.

ence and *passage* in relation to fixed schemata. " In perception no event exhibits definite spatio-temporal limits. A continuity of transition is essential. The definition of an event by assignment of demarcations is an arbitrary act of thought corresponding to no perceptual experience. Thus it is a basal assumption, essential for ratiocination relating to perceptual experience, that there are definite entities which are events ; though in practice our experience does not enable us to identify any such subject of thought, as discriminated from analogous subjects slightly more or slightly less." [1]

Whitehead's formulation of a system of the " definite entities which are events ", assumed to be " essential for ratiocination ", was first and most explicitly presented in the *Principles of Natural Knowledge*. The exposition there given, however modified later, is fundamental to his whole philosophy. Its ingenious formulation is, to a high degree, consistent with a genetic and empirical account of reality, but it exhibits divergences from such an account in the treatment of the relation of *events* to *objects*. " Eternal objects " seem to correspond roughly to what I have described as qualities, but " physical objects " seem to be a rather hybrid category. The fact that " Objects enter into experience by *recognition* " immediately suggests an interpretation of objects as functions of conceptual analyses, *i.e.*, as objects of *discourse*.[2]

(15·3). " The ways in which events and objects enter into experience are distinct. Events are lived through, they extend around us. They are the medium within which our physical experience develops, or, rather, they are themselves the development of that experience. The facts of life are the events of life.

" Objects enter into experience by way of the intellectuality of recognition. This does not mean that every object must have been known before ; for in that case there never could have been a first knowledge. We must rid our imagination of the fallacious concept of the present as instantaneous. It is a duration, or stretch of time ; and the primary recognition of an object

[1] Whitehead, *Principles of Natural Knowledge*, 17 : 4.

[2] See also 14·1, 14·2, 18·2, 18·3, 21·3.

consists of the recognition of its permanence amid the partial events of the duration which is present. Its recognition is carried beyond the present by means of recollection and memory.

" Rational thought which is the comparison of event with event would be intrinsically impossible without objects."

The initial dichotomy between events and objects, in Whitehead's treatment, is obscured by the ambiguity of the term " event ", and the fact that Whitehead chooses to use it in its more abstract (and for his thinking, more convenient) significance, rather than in its more concrete and usual significance. Eddington, in *Space, Time and Gravitation*, gives the following lucid statement of this fundamental distinction: " A point in this space-time, that is to say a given instant at a given place, is called an ' event '. An event in its customary meaning would be the physical happening which occurs at and identifies a particular place and time. However, we shall use the word in both senses, because it is scarcely possible to think of a point in space-time without imagining some identifying occurrence ".[1] Whitehead's isolation of the extensional treatment of " event ", in contrast to Eddington's procedure, was probably influence by the European philosophical tradition, and undoubtedly facilitated neat metaphysical construction, at the cost, it seems to me, of a certain artificiality.

" The whole investigation," as conceived by Whitehead, " is based on the principle that the scientific concepts of space and time are the first outcome of the simplest generalizations of experience, and that they are not to be looked for at the tail-end of a welter of differential equations ".[2] *But why the alternative?* Why not simply say *among* the first generalizations of experience, and thus avoid the whole artificial procedure of building up a purely extensional cosmos and then having the problem of how to get the concrete qualities back into it? I can see but one answer, namely, that the author himself

[1] Eddington, *op. cit.*, p. 45.
[2] Whitehead, *op. cit.*, Preface, 6.

begins with the equations of mathematics and follows the Platonic doctrine of the *a priori* character of space and time. The resulting treatment of "*eternal objects*" (which may be identified as hypostasized concepts of quality) and the problem of their "*prehension*" in actual "*occasions*" comes to have, it seems to me, an extreme artificiality. And all this, I believe, might have been avoided by actually beginning with a study of the "first generalizations of experience" in the infinity of their relations. It is then possible to treat special schematic and symbolic constructions, which prove to be of unusual applicability, as instruments of extraordinary importance, which must be conceived as representative of structural relationships that are pervasive of nature as focused in human experience. It does not seem to warrant the assumption that these relationships are in any sense unique, or ultimate, or more "real" than other relationships.[1]

The Intuitionalism of Bergson, although negatively warranted as an attack on arid rationalism in philosophy and science, and although giving an even unique re-

[1] The treatment given above may be supplemented by the discussion. "What is an Event?" by A. E. Murphy in *The Philosophical Review*, November 1928. The exposition in this article, developed from technical considerations of mathematical physics and metaphysical theory, is in striking accord with the thesis here developed from psychological and logical considerations. "The movement (the Gospel of 'Events') that began as a protest against any isolated and self-complete reality has ended by setting up just such an entity. . . . Having been persuaded that objects as such do not change, exist or interact, we are now asked to believe that they do not exist or change at all but that something else that is not an object does possess in itself all these admirable features and is thus worthy to occupy the privileged place from which objects have been deposed. . . . My thesis is that the distinction of concrete events from their spatio-temporal properties is a philosophical necessity. Events have a spatio-temporal structure, to be sure; they also have colour, electrical charge, etc., under various conditions. The spatio-temporal order is more pervasive but it is not more concrete, it no more *is* the event than any other set or combination of objects. It is strange that philosophers have not been warned in these matters by the words of the physicists themselves. The event as spatio-temporal lacks just those characters which makes the concrete event so important. . . . The function of mathematical structures is to characterize events, not to constitute them."

cognition to the evolution and function of the *cadres d'intelligence* (the physiological - logical structures of systematic reasoning) nevertheless starts with the assumption of an absolute Intelligence prior to and independent of the structures of reason. Moreover, Bergson conceives of this Pure Intelligence as merely utilizing organismic and social structures, which are its own petrified forms and deposits, and, therefore, constantly tending to ignore these categories and " break through " rational thought into the life of pure intuition. Bergson and Delacroix, who follows Bergson here, carry this argument to the point of insisting that the disorders of aphasia and the vicissitudes of the actual forms of organic and symbolic processes in animal and social life do not affect this inner life of Intelligence at all.[1] Practically this leads Bergson to conceive of the purest type of thinking, which he calls Metaphysics, as *a priori* to and independent of the whole symbolic structure of human reason. " Metaphysics may be defined as that science which wholly dispenses with the use of symbols." [2] Non-symbolic processes of intuition are here *substituted*, according to Bergson, for the developed habits of rational life, in the highest creative intelligence. This fundamental divorce between instinct, intuition and mysticism, on the one hand, and intellect and reason, on the other hand, characterizes all Bergson's writings, and in the end a discontinuous mysticism is accorded absolute authority and made immune from the criticism of rational intelligence. Such a study of the Growth of Reason as has here been undertaken, if compared with such a study as Delacroix's *Le Langage et la Pensée*, at least clarifies the implications of Bergson's hypothesis and presents the alternatives between a modified doctrine of absolute mind and a thorough-going genetic theory of reality in sharper relief.

Metaphysics has a persistent warrant in the motive of curiosity and human eagerness to comprehend life in its

[1] Delacroix, *op. cit.*, pp. 477-573.
[2] *Introduction to Metaphysics*, p. 6.

interrelations, in its whole. As such, metaphysics is a game, an art, an adventure. And like any adventure into a far country, undertaken for sheer love of the sight of sunrise over new forests, it may yield the discovery of useful mines. And *vice versa*, even if pursued with ulterior motives, metaphysics, while often failing to yield the desired philosopher's stone or transcendental sanctions, may nevertheless yield its own ample rewards. As a line of defence against the encroachments of science upon cherished doctrines, metaphysics is unprofitable. But as an adventure it offers an attractive field in a day when, in the literal sense of the words, there are no "uncharted seas".

CHAPTER VII

LOGIC IN SOCIETY

I. SOCIETIES of invertebrate animals frequently exhibit structures, or patterns, upon which the life of the individual is essentially dependent. But on this level the social structure is individualistic in its transmission; it is determined by the specific organismic structure of the component individuals. Among higher vertebrates which are characterized by a greater plasticity of individual behaviour, social ways are gradually built up, accumulated, interrelated, and transmitted in social tradition independently of changes in physiological inheritance. Thus birds or apes, to a slight degree, and human beings, to a very high degree, are " social animals " in a sense which is not true of ants or parasites. Personality and behaviour are largely constituted on this level by social processes.

The growth of *symbolic activity*, communication and reflective thinking, has been shown to be effected by the interaction through phonetic processes of *physiological patterns* in intellectual activity and of *cultural patterns* in social organization. This is a continuous process throughout the whole course of human life. All items of social behaviour, however, do not contribute to the organization of intellectual activity to the same degree, and are not equally affected by intellectual experiment. Customs, arts and industrial processes may be transmitted by rote from generation to generation without becoming subjects of discussion, reflection or analysis. Some of these items may also become so emotionally charged by association with objects of intense love and fear as to be highly immune to critical discussion and intellectual reorganization.

All human societies exhibit a realm of *quasi-symbols*:

items which are gradually becoming differentiated as symbols from total situations in which they appear as representative and instrumental, and items which originally functioned as specific symbols of other things and activities, but which have lost their symbolic character and become in themselves objects of love, dread or loyalty. Thus certain manners may come to be regarded as symbolic of more important attitudes. On the other hand, words and rituals may become sacred or obscene in themselves and employed as instruments of immediate power in magical formulæ. Such *quasi-symbols* figure as elements in intricate culture complexes, which supply the basic fabric of all human societies, primitive and advanced. Conservative interests tend to resist the analysis of traditional social organization and the interpretation of crucial social stimuli as symbols of specific activities and interests subject to critical examination and revaluation. But this logical analysis and interpretation of social institutions is the mainspring of cultural progress in advanced civilizations.

The adaptability of a civilization is dependent upon the extent to which all its conditions and processes are represented and organized in symbolic activity. In primitive communities gradual and isolated changes in folk ways are subjected to long and severe social experiment. There is an effective natural selection of culture patterns, as well as considerable conscious adaptation. But in intricate civilizations social changes are rapidly initiated whereof the most important consequences cannot possibly be evaluated except through co-operative discussion and reflective inquiry involving elaborate symbolic apparatus. The welfare of a civilization is dependent upon its capacity to comprehend the consequences of the conditions with which it tampers. *Animals may live well by instincts, primitive communities may live well by culture patterns, but civilizations can live well only by symbols and logic.*

The problem of human heredity may be cited as an example. In the past the lines of physical heredity

were primarily determined by the *differential death rates* of various social groups, *i.e.*, by lethal selection. To-day the lines of heredity are largely controlled by *differential birth rates*. In short, civilization has radically changed forces which control heredity, and for the most part without any regard for the results involved. The problem of the intelligent control of the social forces which condition the lines of organic heredity is perhaps distinguished by a greater disparity between the magnitude of its consequences for human weal or woe and the extent of the general interest and attention directed to its solution than any other question. In its operation the heredity of organic constitution underlies and conditions the whole growth of symbolic activity, logic and wisdom. It is the foundation of the growth of reason. As regards its control, however, it may be simply classified as one of the whole group of vital social processes whose effective direction is dependent upon the *progress of symbolism and social theory*.

Words, ideals, slogans and ritual function as mechanisms of social control and as elements in individual intention. But only in so far as they are recognized as the specific instruments of larger affairs, and explicitly differentiated from the contexts which they mediate, can such items be properly described as *symbols*. The clear recognition of the symbolic character of any cultural element does not destroy its instrumentality in the formulation of motives and in social control, except in so far as its efficacy depends upon the deception of the persons controlled. On the contrary, such recognition makes the instrumentality of ideals exact and delicate, sensitively adjusted to their more remote implications.

"A word," as Cooley has well said, "is a vehicle, a boat floating down from the past, laden with the thought of men we never saw. . . . Such words as good, right, truth, love, home, justice, beauty, freedom are powerful makers of what they stand for." [1] This, however, is cer-

[1] Cooley, *Social Organization*, p. 69.

tainly not true of all instances of the use of these terms. And other less auspicious words have certainly wrought a preponderance of disastrous consequences. And descriptions of evil are quite as salutary as eulogies of good. *The utility of words and ritual in enhancing the beauty of life is directly proportionate to the accuracy with which they are employed as symbols.*

II. Logical reflective inquiry has emerged as an intrinsic feature of the evolution of human society, gradually becoming more and more central, vitally instrumental, interesting and enjoyable in itself. The promotion of excellence of symbolic organization and functions, or in other words, *education, as the cultivation of wisdom,* becomes properly the *supreme* concern of advanced civilization. And in this connection, *logic* as " the analysis and criticism of thinking " would seem to be an affair of central importance. It should naturally be one of the most fascinating subjects in a modern university curriculum. It is safe to predict that as logical theory becomes clarified, in its relations with new physiological, psychological and social studies, it will rise to a position of recognized importance more in accordance with its mediæval prestige than with its recent disrepute. We can hardly expect to develop adequate theories of social organization and education apart from an adequate theory of the nature and principles of reflective thinking. But it is obviously, to a considerable extent, a subject for mature graduate students. Anyone who, at the present time, conceives that he is equipped to expound, with full assurance, the interpretation of logical theory thereby reveals that he is not. One who has gained any insight into the intricacies of the problems of logical theory to-day will have acquired a great deal of humility. He will at best be ready to take his place in a seminar of students. And he will inevitably give a large share of his attention to historical and comparative methods of approach, as well as to related problems in linguistics and physiology.

An elementary logical theory, or introductory logic, may, however, be effectively introduced into secondary school curricula in relation to the treatment of concrete problems. A well-reported experiment, recently published in Teachers College, Columbia University, "Contributions to Education", demonstrates the possibility and value of such elementary education in logical theory in High Schools.[1] Conscious attention directed to the analysis of *methods* of study and *principles* of valid inference, in the course of a year's study of history, led to definite recognition of important logical principles which were further reflected in improved logical habits in the treatment of the new subject-matter. Moreover, this phase of the work did not retard the acquisition of historical *knowledge*, according to the evidence of a series of tests and measurements, but rather facilitated its progress.

Fundamental rational habits are, for the most part, acquired unconsciously in the life of the individual. Nevertheless, the highest excellence in symbolic thinking is dependent upon the conscious symbolic treatment of the principles which are allowed to control such thinking. Such attention to the modes of mind gradually leads into more and more intricate problems of logical theory and metaphysics.

III. Education in *logical activity* is, however, something quite different from courses in logic. It begins in the cradle, or rather, to be modern, in the kiddy-coop. The acquisition of more elementary personal habits underlies and conditions the acquisition of verbal habits. And, *vice versa*, linguistic education in the nursery has very important bearings upon emotional development and personality formation.

(*a*) The basis of systematic reasoning is laid in the development of well-adjusted personality in *the nursery child*. The whole story of the growth of symbolic activity indicates that the development of emotional attitudes

[1] Helseth, I. O., *Children's Thinking*.

and the development of symbolic thinking are phases of one total personality development. The organization of the symbolic processes which constitute reason is determined by underlying physical conditions, motor co-ordinations, the growth of emotional attitudes, the experimental organization of life situations, and conversations between the child and his associates. Consideration of these factors leads to the following general statement: The primary principles of the intellectual education of the nursery child, beyond its basis in general habit integration, are the co-operative and systematic approach to objective situations and the corollary development of well-organized symbolic habits, well integrated with the total personality. The attempt to develop precocity in children for the gratification of the vanity of parents is vicious. Forced verbal development, with the corollary neglect of motor and emotional development and the social adjustments of the child with his playmates, cannot be too strongly condemned. On the other hand, there is no more sense in the old saw, "Let nature take its course", when applied to mental life before six years of age than in the later period of development—except for our ignorance of how to proceed.

Words are the keys of effective co-operation between children and adults. Two apparently contradictory mistakes are commonly made in the use of words between adults and little children; but both arise from the lack of adequate appreciation of the growth and nature of verbal activity in children. On the one hand, parents at first are apt *to place too much reliance upon mere words* in the guidance of little children, and in the second place, they are apt *to neglect the systematic building-up of modes of verbal control.*

Parents often "argue" with infants as if the children were by some magical endowment naturally equipped with "rational minds", capable of native appreciation of logical reasons. Words have no power in life until habits have been built up in relation to words, and little

minds cannot hold several considerations simultaneously and apprehend their mutual relationship. A child of two cannot appreciate reasons why there are certain things which he always does now, as a matter of course, and other things which he does not do. But his habits have been for a long time gradually built up and controlled by such factors as warmth, pleasant tastes, pains, smiles, stern tones, and definite acts frequently evoked in relation to definite types of situations frequently repeated. And all this early positive and negative training in habits must be controlled and conditioned by the delicate use of non-verbal factors, little rewards of laughter, caresses, bits of cookies, and so forth, as well as verbal commendation, and by little punishments of stern tone, slight restraint, denial of desires, and mild physical discomfort, and by attention to the regularity of key situations which condition the growth of regular and well-co-ordinated habits.

On the other hand, while parents are apt to *rely* too much on the use of words and logic in dealing with little children, it is even more profoundly true that they *use* symbols too little and without regard to the more remote benefits to be derived from the establishment of an adequate symbolic apparatus in the relations between parents and children. Conscious attention needs to be directed to the *building up* of verbal habits and verbal patterns. Early in the second year the infant should begin to be responsive to definite symbols of positive behaviour and to " No ! ", the symbol of inhibition.

The symbolic activity of the child can gradually be enhanced by the consistent introduction of certain words in specific contexts, and by the encouragement of free verbal activity in the child, and by the adaptation, on the part of parents and teachers of their own verbal responses, in dealing with the child, to the types and relations which he is able to appreciate and use. By such means, motor habits and emotional attitudes already acquired are *lifted into the sphere of verbal activity*, where it becomes possible

to deal with them co-operatively and rationally; and at the same time *the range and organization* of verbal activity and its logical structure are established. Gradually a clear distinction may be introduced into the life of the older pre-school child between the world of " really true " and the world of " make believe ", so that truth may be introduced in social and objective relations, and at the same time imagination may not be stifled. All this cultivation of logical activity in children requires, of course, great care and patience and affection; but in the end it costs less trouble than early neglect and later maladjustment.

Some very helpful suggestions regarding the introduction of symbolic controls in dealing with little children are offered by the work of Ethel B. Waring, at present Director of Research at the Cornell University Nursery School. Interesting experiments and measurements of the effectiveness of the introduction of an entirely new word " Benito ", as a symbol of success and encouragement, in motor and discrimination tests, are reported. The introductory discussion is probably, however, of greater value:

" It is obvious that consistency is essential in this learning process. If sometimes the mother says ' must ' and does not see to it that the response she demands is given and at other times she does see that it is given, then the meaning of ' must ' is confused and its driving force is weakened. The standard of obedience can be developed only by a consistent use of the word ' must ' or some other word selected as the cue to the response of obedience. When the little child puts his hand on some new object and looks up inquiringly, mother says smilingly, ' Yes, you *may* ', and gives it to him herself, and approves of his response to it. This procedure, if consistent, builds up a standard of permission. When she presents him with something she knows will delight him she may ask, ' Do you *want* it ? ' and his great satisfaction stamps into his nervous system the association with the word ' want '. When repeated this comes to serve as the cue to responses of interest and choice.

" It is obvious that this technique which has been described fails if the mother does such things as the following:

(*a*) Says, ' Don't you *want* to do it ? ' and then exacts obedience.

(If she wants obedience, she should use the cue for obedience, not the cue for choice and interest.)

(*b*) Says, 'You *must*', and then does not exact obedience. (Unless she is ready to exact obedience she should use some other word than the cue word for obedience.)

(*c*) Says, 'you *may*', and then changes her mind and takes away the desired object.

"As the adult technique is extended the child's experiences grow and he organizes them about cue words in his growing vocabulary. His standards of behaviour become more numerous. They also become more comprehensive. It is on the basis of these standards of conduct that he makes his decisions, whether trivial or weighty, decisions as to what he shall do and how he shall act in every situation he faces in daily life. He is fortunate if the words he learns in early infancy can help him all his life to organize his experiences and control his behaviour." [1]

The extent to which the growth of *verbal activity* is *integrated with the whole organization of motor and emotional habits and interests* is dependent upon the extent to which the child has been encouraged to talk about his activities and the extent to which the parent has participated in these activities and engaged in progressively more and more adequate symbolic formulations of activities, interests, problems and possibilities.

(*b*) The relation between the *verbalization* of experience and *mental sanity* has long been recognized by Freud and associated psychiatrists. It has also been emphasized in this country by Frederick L. Wells.[2] It is interesting in this connection that Helen Keller, at the age of six, before her systematic instruction in symbolic activity, displayed a furious and uncontrollable temper. It was, in fact, an unusually severe burst of temper that brought home to Helen's parents a forcible appreciation of the gravity of the situation and led to the discovery of Mrs Sullivan as a person able and willing to undertake Helen's education.[3]

[1] Waring, *Relation between Early Language Habits and Early Habits of Conduct Control*, pp. 7, 8 and 10.

[2] Wells, *Mental Adjustments*.

[3] Keller, *Story of my Life*.

Marie Heutin, the famous French blind deaf-mute was described before the beginning of systematic instruction in symbolic activity as " une animal furieuse ".[1] Unfortunately, normal children have rarely been permitted, under the conventions of society, to develop an adequate symbolic organization (in the sense in which the term has been employed in this study) for many phases of their life, which, even otherwise, are necessarily charged with emotional intensity, such as sex interests and personal conflicts. The unverbalized imaginations, which Freud unfortunately (from the standpoint of this study, at least) calls " symbolic processes ", are especially characterized by the lack of symbolic organization as here defined. This is the significance of Freud's emphasis upon the " *unconscious* " as the realm of *pathological complexes*. An emotional " complex " may be defined as an intricate but relatively isolated reaction-system, largely controlled by internal stimulation, and more or less dissociated from the organized processes of conceptual activity (the " conscious mind "). In severe cases of mental breakdown pathological complexes include concepts, but include them as subordinate elements in fixed reaction-systems; in mild dissociation, pathological complexes are typically non-conceptual. These pathological complexes are syntheses of intention and imagination which cannot be intelligibly controlled because they remain unanalysed behaviour-patterns, reinforced by strong visceral factors, and operate with a mass action, like emotional avalanches. The child who does not have a free and happy *rapport* with his parents, or who lacks adequate verbal organization, cannot talk over with his parents the fears that possess him. In so far as the child's thought remains unsocialized it inevitably remains subject to the ravages of morbid imaginations.

The original *lag* in verbal organization in relation to the organization of other activities has been described. This original lag is all too frequently increased by the

[1] Arnould, *Âmes en prison.*

neglect or even the suppression of verbal activity in the pre-school period. Baby's first words are a delight to all parents. But to parents who lack the training, the imagination, or the leisure to appreciate the educational opportunity offered, the child's incessant talk and questioning is apt after a few months to become a nuisance. Thus verbal organization, which can only be effected through social co-operation, becomes thwarted and neglected, while motor co-ordination and emotional attitudes rapidly develop.

As a result of such neglect the naturally " ludic ", or emotional factor, in the control of the child's verbal activity, so far from being naturally and gradually brought under control of the mind, is given free reign. But the organization of emotional habits goes forward apace, for better or for worse, while the organization of logical habits waits upon social attention and intelligent direction. This is by no means a plea for an organized attack on the playfulness of children's thought. But it is a plea for definite attention, either in the home or in nursery schools, to the cultivation of accurate and well-organized verbal habits through thorough discussion, the objective treatment of objective situations, and the quiet and free consideration of emotional interests, loves and fears. If an adequate experimental logic can be the means of introducing a little more play into the thought-life of adults and a little more logic into that of children it will make for better understanding and more happiness all round.

(*c*) Our study has emphasized that the *socialization of thought* and the *rationalization of thought* are, to a high degree, equivalent terms. The child's love of conversation and eagerness for *stories* is rationally the occasion of the most universal form of art but is, at the same time, the first and fundamental means by which the scholastic definition of man can be achieved, and human infants can be educated to become " rational animals ".

Lucy Sprague Mitchell has made a very great contri-

bution to the literature of childhood and to the pedagogy of reason by her clear recognition of these possibilities, and her pioneer work in creating new models for materials to meet these educational and artistic needs: "I have assumed that anything to which a child gives his spontaneous attention, anything which he questions as he moves around the world, holds appropriate material about which to talk to him, either in speech or in writing. I have assumed that the answers to these his spontaneous inquiries should be given always in terms of a relationship which is natural and intelligible at his age and which will help him to order the familiar facts of his own experiences. Thus the answers will themselves lead him on to new inquiries. For they will give him not so much new facts as *a new method of attack*. I have further assumed that any of this material which by taking on a pattern form can thereby enhance or deepen its intrinsic quality is susceptible of becoming literature. Material which does not lend itself to some sort of intentional design or form, may be good for informational purposes but not for stories as such. . . . I assumed that in stories as in other educational procedure, the place to begin is the point at which the child has arrived—to begin and lead out from. With small children this point is still within the 'here' and the 'now,' and so stories must begin with the familiar and the immediate. But also stories must lead children out from the familiar and immediate, for that is the method both of education and of art. Here and now stories mean to me stories which include the children's first-hand experiences as a starting-point, not stories which are literally limited to these experiences. . . . Now a two-year-old's range of experiences is not large. So his stories must be of his daily routine—his eating, his dressing, his activities with his toys and home. These are the things to which he attends: they make up his world. And they must be his very own eating and dressing and home, not eating and dressing and homes in general. Stories which are not intimately his own, I believe, either pass by or strain a

two-year-old; and I doubt whether many three-year-olds can participate with pleasure and without strain in any experience which has not been lived through in person." . . . "To the child the familiar *is* the interesting. And it remains so I believe through the transition period—somewhere about seven years—when the child becomes poignantly aware of the world outside his own immediate experience—of an order, physical or social, which he does not determine, and so gradually develops a sense of standards of what is to be expected in the world of nature or of his fellows along with a sense of workmanship."[1] "The attempt to amuse children by presenting them with the strange, the bizarre, the unreal, is the unhappy result of this adult blindness. Children do not find the unusual piquant until they are firmly acquainted with the usual; they do not find the preposterous humorous until they have intimate knowledge of ordinary behaviour; they do not get the point of view of alien environments until they are securely oriented in their own. . . . Nonsense when recognized and enjoyed as such is more than legitimate; it is a part of every one's heritage. But nonsense which is confused with reality is vicious, the more so because its insinuations are subtle. So far as their content is concerned, it is chiefly as a protest against this confusing presentation of unreality, this substitution of excitement for interest, that these stories have been written. It is not that a child outgrows the familiar. It is rather that as he matures he sees new relations in the old. If our stories would follow his lead, they should not seek for unfamiliar and strange stuff in order to intrigue him; they should seek to deepen and enrich the relationships by which he is dimly groping to comprehend and to order his familiar world." Later on, as the child is groping for a larger world of experience. "Stories should follow this

[1] These statements may be compared with Piaget's description of the young child's thought as exhibiting a *naïve realism*, and his lack of sense of *chance*—because he lacks the sense of the expected against which "chance" is recognized as such.

general trend, and open up relationships in larger and larger environments until at last a child is capable of regarding the whole world in its infinite physical and social complexity as his environment." " I do not wish this to be interpreted to mean that I think all fairy stories for ever harmful. From the beginning innocuous tales like the ' Gingerbread Man ' should be given for the pattern as should the ' Old Woman and her Pig '. Moreover, a child is somewhat oriented in the physical and social world, say at six or seven—I think he can stand a good deal of straight fairy lore. It will sweep him along with it. He will relish the flight the more for having had his feet on the ground." [1]

(*d*) *Religious education* may be defined as the art of providing growing persons with adequate symbols for the organization of beautiful personal experiences and for establishing rapport with the most cherished ideals of other persons and cultures, especially the culture within which they themselves must live. Bedtime stories and ritual, songs, dramatic presentations and free co-operative discussion of religious themes are instruments of such education.

The contribution of experimental logic to religious education lies in a recognition of the function of symbols in the organization of experience. The careless organization of the deepest emotional experiences of children about symbols, offered as absolute, which in later life may be found to conflict with effective adjustment to larger social groups and vigorous participation in scientific activity is the cause of untold spiritual disaster. Similarly, the attempt on the part of parents and educators to evade responsibility for controlling the symbols in terms of which the young child will organize his own intense attachments and interpret the ideals of others, on any sentimental " laissez-faire " theory of " allowing the child

[1] Mitchell, Lucy Sprague, *Here and Now Story Book*, quotations from the Introduction.

to develop his own spiritual life without adult interference," is equally futile. Its practical effect is, of course, simply to leave this vital function to the operation of chance environmental factors. Waring's formula may be quoted again in this connection: "The child is fortunate if the words he learns in early infancy can help him all his life to organize his experiences and control his behaviour."

The child's experience is an enlarging experience. However adequate its early symbolic organization may have been and however wide the opportunities for new and varied suggestions, definite education in the *critical revaluation of ideals* and objects of interest is a crucial phase of any adequate programme of the emotional and social integration of personality (the concern of religious education). Such education represents a stage beyond the elementary acquisition of symbolic patterns. It is not a substitute for the primary conditioning in attitudes, but a complementary educational process. The religious education of the past was usually content to stop with the indoctrination of the young in the most approved standards and ideals of the particular culture. Contemporary educators, on the contrary, have emphasized education in the reflective criticism and reconstruction of ideals. A clear recognition of the function of symbols, however, indicates the naturally complementary relationship between these two phases of ethical development.

Religious conservatism is, in large part, rooted in genuine anxiety to preserve and extend interests and types of experience which have been estimated as being of supreme value, either as immediately rapturous experiences, as a way to the integration of sustained and beautiful living, or as the keys to happiness in other realms of existence. Such conservatism is, in fact, the very essence of established religion, and has its sources deeper than mere ignorance of the nature of the symbolic process. But in large part religious conservatism is grounded in and reinforced by a treatment of symbols as absolutes, a treatment of "essenses" as "substances".

Terms which have had a rich history in various cultures inevitably acquire a range of meanings many of which are quite incompatible with others. McGiffert has argued that the only identity which can be found between the whole company of Christians is located in the term itself —and, it should probably be added, in the historical Jesus to whom all Christian sects have at least paid deference and by whom they have all been more or less affected, in however slight degree. Similarly, the term God, like other much used terms, has taken on many varieties of meanings. There is no other identity except the possibility of substitution in various contexts, between " a principle of determination " as a metaphysical device and " Jehovah, Allah, Brahma, Father in Heaven, Order of Heaven, First Cause, Supreme Being, Chance ".[1] For some of us Natural Piety, the immediate sense of joy in the sources of life and fellowship with thrushes and stars, and Community of Ideals, the sense of common human aspirations, are valued meanings in experience, which others in various cultures have expressed in the term God or kindred terms. We may seek to preserve the term as a symbol of our fellowship with them in these experiences. But we must recognize that men have also expressed many meanings in the term God, such as Invisible King and Overruling Providence, that we may not share. The meanings which I find and would gladly express in the term God others may not share. They may not use the term at all. Others may share my meanings or some of my meanings, but deem it dishonest to use the term. Others would use the term to express wholly different meanings. We want to apprehend the thought of others. And we want to share our own thought with others. Therefore we must learn to think beneath symbols, and be willing to accept new terms as well as new meanings.

(*e*) *School education* is a continuation and development of the same methods that are fundamental in nursery

[1] Whitehead, *Science and the Modern World*, p. 250.

education. Logical methods of thinking are best developed in the co-operative treatment of concrete problems, where children participate with adults who bring well-tested principles to bear in the control of their thinking. Thus children gradually acquire essential symbolic formulas not in irrelevant contexts but in integral relation to the types of experience in which they are most valuable. Thus the organization of the children's symbolic processes is effected, through open discussion, selected tradition, and objective experiment, in socially instrumental forms rather than by haphazard associations and in emotional complexes.

Study of the growth of symbolic activity, however, leads to clear recognition of the value of " drill work ". Attention to building up convenient symbolic systems, *e.g.*, multiplication tables, linguistic patterns, various " facts ", and chronological schemata follows naturally from a recognition of the function of symbolic patterns and especially of formal schemata as systems of reference and inference in reasoning. In some ideal society interest and function may be perfectly integrated. But in society as it is now constituted there must be considerable stretches of drudgery, or at least of steady drives divorced from immediate so-called vital interest. The most practical present social ideal would seem to be a fair general distribution of such unpleasant labour. The child will not unwillingly accept his share of fixed tasks, eager as he is to become a fully participant member of the community, if he is sympathetically appreciated, and if the proportion of drill work in education is relatively small. Nevertheless, it must be emphasized that the structures and their integration with other interests and activities is a far more important concern than the acquisition of elaborate but unrelated formal structures. And here drill work is useless. The effective organization of symbolic activity and the development of rational habits of thinking can only be established through the co-operative participation of individuals with other individuals in reflective

treatment of shared problems. In the transition between academic life and professional life, to repeat Waring's formula with enlarged meaning, " The scholar is fortunate if the symbolic patterns and rational interests he learns in school can help him all his life to organize his experiences and adequately to share in the control of situations in which he participates."

IV. The preceding paragraphs of this chapter have dealt primarily with implications of the study of reason for educational theory and practice. The caption, *logic in society*, has, however, a much larger significance. It suggests the ideal of *society as logical*, that is, society as composed of institutions and processes characterized by a wealth of symbolic interpretations and constantly revaluated and reorganized in reflective inquiry. The *integration of logic in society is a desideratum*—the integration of symbolic interpretation and reflective inquiry in social institutions, and the integration of symbolic interpretation and the apprehension of values.

This suggests that the educational significance and the instrinsic personal values of contrasted types of economic and other social institutions must never be neglected in their evaluation. An example will suffice to illustrate the point: Economists frequently feel it necessary to justify every movement towards democratic and representative control of industry by arguments, often sound, but often dubious and specious, of the increased industrial output which would be effected by such changes. Quantity of output is certainly a vital consideration in industrial organization. But it is hardly more important than the promotion of intellectual activity, moral responsibility, and happiness-in-work of the participating workers. Intelligent labour interests and liberal opinion should further the type of industrial organization which best combines a *fair* degree of efficiency in output with a *fair* degree of moral significance, without sacrificing either set of considerations to the other, and without indulging in the

optimistic delusion that the most democratic type of industrial organization is necessarily the most efficient.

V. Obviously the ramifications of the theme of the possibilities of society as logical would carry us far beyond the scope of this book. The author will, therefore, conclude with the formulations of various specific canons of the cultivation of wisdom in personal and social life.

Canons of Wisdom.[1]

I. *Mens Sana in Corpore Sano.*—Attention to the physiology and social conditions of thought is an immediate implication of the recognition of the growth of thought as a physiological and social process. The interest of the community in the control of physical inheritance, as a basic factor in the control of the intelligence of the community, in so far as its procedure is sensitive to the interests of individuals, is an obvious corollary of the appreciation of the nature of intelligence. Furthermore, an understanding of the nature of reason shows the illogical character of any scheme of public education which is indifferent to public health, or to the distribution of the economic resources which ultimately condition play opportunities, nutrition, sunlight, rest, leisure, medical attention and emotional adjustment—for poverty breeds more bad logic than sophistry.

Similarly, attention to the condition of individual well-being and the enrichment of the range of individual interests is at least a first step in the cultivation of logical excellence. It is impossible to tell how much of the bad metaphysics of some astute thinkers must be attributed

[1] The following inventory is a collection of the sort of useful principles for the guidance of intellectual activity which would seem to me to follow naturally from a study of the growth of symbolic activity and an experimental logical theory. It is obvious that these canons are in part the culmination of the preceding discussions of the genesis of symbolic activity, and in part have their source in other fields of investigation. They represent an integration of some phases of the study of the growth of reason with other practical interests.

to bodily ills and emotional maladjustments. Educators and social workers need constantly to recognize these fundamental causes of the otherwise irritating "unreasonableness" of those whom they teach, of themselves and their associates.

II. *Logic as Catharsis.*—The technique of psychoanalysis is largely, as its name implies, a technique for the development of an adequate symbolic activity (as the term is used in this study) in the control of the behaviour of abnormal personalities who suffer from the defects of faulty nurture and inadequate education. Since mental abnormalities are complex and individual in character the technique is necessarily experimental and incomplete. Its significance for the development of normal personality lies, first, in the recognition of various early behaviour-patterns which tend to cause serious disorders in later life, and, second, in the recognition of the importance of symbolic activity, *i.e.*, verbal organization, in the control of habits which otherwise might be insidious, uncontrollable and disruptive in their operation.

Adequate adjustment of personal interests, both in individuals and in communities, can only be effected on the symbolic level. The growth of adequate symbolic apprehension of every important organic interest, and the logical organization of various interests and activities, as symbolized, is the only adequate basis of the integration of personality. To a considerable extent this organization may be worked out by the individual, but practically its foundations and its reorganization at crucial points is dependent upon the catharsis of actual communication in a friendly atmosphere. Whoever cherishes things either "not fit to talk about" or "too sacred to mention" is in danger of bad judgment. This, on the other hand, is not an argument for the continual employment of one's friends as depositories of one's own peculiar interests. Social participation in common interests and objective activities is the royal road to logical health.

III. *The Canon of Empiricism.*—The ultimate grounds of truth are the social adaptations of organisms in their environments. Originally valid intuitive processes were indirectly determined by natural selection. In human life, thinking has become a socially selected and artificially cultivated process. The value of logical activity is guaranteed in its origin. It is an indigenous phase of life and its contribution is perpetual. The cultivation of symbolic activity accords to mature thought the systematic character and effectiveness which it otherwise lacks. The generation of new truth is not, however, a mere matter of the manipulation of existent concepts. Reliance on the mere dialectical reorganization of the deposits of the intellectual activity of the past not only robs us of the possibility of independent contribution to the growth of human knowledge, but it cuts us off from any possibility of genuine understanding of the meanings originally conveyed by the symbols we manipulate. To cite Plato or Jesus with authority is to give proof of the misunderstanding of their thought. The vitality of thought and the progress of science depend upon constant recourse to dealings with raw experience. Students who experience industrial labour best appreciate labour problems; only poets who suffer love, triumph, and defeat understand poetry or create lyric literature; and scientists who deal with new data are most apt to contribute significant systems. Such emphasis upon recourse to immediate struggle with natural resources and participation in social processes does not imply an indifference to systematic thought, nor impugn the contribution of those who principally participate in the common quest of truth by the elaboration of conceptual systems.

Empirical inductions have their immediate warrant in their own immediate situations. Their truth is pragmatic, in a literal sense. Such discovery not only constitutes the ultimate foundation of all knowledge, but in relation to developed systems of thought represents the staking out of pioneer fields and the leaven of old civiliza-

tions. The ultimate foundations of truth are labour and love.

IV. *The Canon of Systematic Inference.* — Formal schemata are the structure of human reason. Thus man may be by nature highly imaginative, but it is only by virtue of culture that he becomes a rational animal. The organization of symbolic patterns which represent generic phases of experience, the elaboration of systems of reference and inference, the systematic exploration of cross-inferences whereby symbolic processes are organized into intricate systems of more or less internal consistency, and the utilization of such structures in the control of new theory and concrete situations constitute the fundamental *modus operandi* of rational intelligence. Inference may be largely organic, or it may be largely formal. The most important inferences involve intricate processes of both types. The possession of a rich equipment of such established intellectual structures, well integrated with implicit habits and interests, and the habit of controlled thinking, systematic inference, and suspended hypothetical thinking, are the marks of rationality.

Thus, historically, Pythagorean numerology, Greek dialectic, and Mediæval scholasticism constructed the apparatus of modern science. Experiment is nothing new ; and Bacon's criticism needed to be directed in large part against the crude " empiric method ". The new feature of seventeenth-century science was the *systematic* exploitation of experiments and the *systematic* interpretation of their results. Mathematics is obviously the most important single instrument of this sort, but mathematical interpretations cannot fruitfully be divorced from other types of systematic inference. Dialectic is sterile only when it is regarded as an instrument in itself for the attainment of truth by itself, or is cut off from empirical methods.

At times the violation of logical consistency may be warranted—opinions confidently accepted in relation to concrete situations may afford a better basis of conduct

than the results obtained through indirect inferences from previous conclusions. But in such cases *the normative principle* of consistency, the canon of systematic inference, demands the revision of such opinions or else of the whole structure of previously accepted knowledge which issued in conclusions which were found unacceptable or false in the new concrete contexts. Suggestions which are contradicted by previous knowledge demand especially clear empirical evidence before their acceptance is warranted. When such opinions are accepted they convict the previous organization of thought of error, or inadequacy, or at least false implications. Thus the previous organization of thought *ceases* to be knowledge and is immediately recognized as doubtful or even false theory. The recognition of such inconsistencies is crucial for the growth of rationality in life. The common course (far more vicious than the fallacies listed in the text-books of formal logic) is to carry along systematic structures of thought and, in the pinch of " practical situations ", or under the stress of emotional pressure, to accept practically and to will to believe principles inconsistent with the implications of the accepted systems. In such cases, it is customary to turn the honest truth that " life is essentially inconsistent " into an excuse for not creating the maximum consistency possible. The result of such procedure is superficiality of thought and confusion and ineffectiveness in life. Logical inference is not infallible. It is a practical instrument of thought. But it is an essential instrument of the life of reason.

V. *Controlled Experimentation.*—Controlled experiment is experiment controlled by theory. A scientific experiment is said to be " controlled " when it is so framed that the operation of all other factors may be assumed to have been eliminated, except the factors which are explicitly taken into account and whose variations are the subject of the investigation. It is obvious that the validity of this assumption depends upon the accuracy and com-

prehensiveness of the theory upon which the assumption is founded. Moreover, the rigour of the control is always a matter of degree; experiments which would be considered as adequately controlled in the measurement of various types of electric-light bulbs might be quite "uncontrolled experiments" if applied to such problems as the weight of light or the "ether drift". And, theoretically, as I have suggested in the introduction, an absolutely controlled experiment is a contradiction in terms. Nevertheless, the rigorous control of the conditions of experimentation is one of the two fundamental principles of exact science, as contrasted with crude empiricism and common sense—the other being systematic inference. Science walks on these two legs.

VI. *The Definition of Terms.*—It is fairly well recognized that exact definition of terms in discourse and even in individual reflective thinking is necessitated by the fact that the same symbols carry different implications in the minds of different persons and even for the same person in different contexts. The loose interweaving of such scattered references is the surest way to construct flimsy theories. When concepts are treated as absolute, or when theoretical constructions are adopted *en masse* and buttressed by emotional supports, the controversy which results leaves the participants farther apart at the end of the argument than in the beginning. Although thoroughly discredited, "the idols of the market-place", as Bacon called them, still exercise a baneful influence on human life.

But when we try to give definite form to this demand for definition the matter ceases to seem so simple. In general there are two main types of definition: deictic definition (definition by "pointing"), and systematic definition (definition by fixing the *locus* of a term in some previously established symbolic system, or at the intersection of two or more previously established concepts). For example, if I want a friend of mine to know the taste

of alligator-pears, my best procedure is to take him to a restaurant where these fruits are served, or if I want to explain what is meant by "gold-brick" in army slang, I may tell an anecdote in which that term was used. This is the primitive and the ultimate mode of definition, and in a sense all other definition is a refinement of this method. But, if I ask a mathematician to tell me what a cosine is, he might draw a triangle on a piece of paper, but I would be little helped by this unless he went on to describe a mathematical system and the exact locus of this term in that system. Similarly an ornithologist might tell me that an American "robin" is a member of the "thrush family", having certain "differentiæ".

In the elaboration of ideas definition becomes more and more difficult. All really adequate definition of important terms must be given in relation to clearly described situations and previously formulated systems of thought. Bogoslovsky aptly remarks: "If we want to see how up-to-date a modern text-book is, we must note how many definitions there are and where they are to be found. The farther they are from the beginning and the fewer in proportion to the general content of the book, the more modern is the text-book." [1] The whole course of the study must build up the basis of the adequate definition of the important terms. It cannot be laid down at the start.

The *Gestalt* movement in psychology might be fairly accurately described as an insistence that the terms in which mental life is to be described must be developed in the process of the science, not laid out in advance by *a priori* systems or borrowed uncritically from other sciences. This general principle applies to all sciences and to metaphysical and ethical theories. Interpretation cannot proceed apart from concepts, but the concepts of any science or system of thought must be constantly reinterpreted in the progress of the investigations.

The threefold relation in science between basic *empirical concepts, explicit systems of inference,* such as

[1] Bogoslovsky, *The Technique of Controversy*, p. 8.

logic and mathematics, and *new experimentation* is illustrated by W. F. G. Swan in his address as Retiring Chairman of the Physics Section of the American Association for the Advancement of Science: [1]

" We are all familiar with the satisfaction which we feel when things are accounted for on the basis of certain hypotheses which we like. But an attempt to establish even the most plausible of these hypotheses usually results in sorry failure. The average physicist would doubtless be much pleased if he could see some way by which gravitation could be transmitted as the result of strain in an elastic medium. If some philosopher should ask him what he means by an elastic medium, he may be wary and give a formal definition, but the thing which really gives him satisfaction about the medium will be the thought of a piece of elastic and the belief that the medium acts in some way analogous to that piece of elastic. If the philosopher should ask why the elastic pulls, he will reply, ' Well, that is a matter of cohesion, but we believe that when the molecules of the elastic are separated from each other, they tend to come together again.' ' But,' says the philosopher, ' why do they do this ? ' ' Well ', replies the physicist, ' although we speak crudely of their being separated, we really believe that they are embedded in a medium which has elastic properties, so that it resists their separation. ' But what do you mean by the medium having elastic properties ? ' says the philosopher. ' That it is in some way analogous to a piece of elastic,' says the physicist. ' But why does the elastic pull ? ' says the philosopher. And so we are back where we started.[1]

" The mind has decided that it likes the idea of a body moving in a straight line with constant velocity, and it would like to see everything going that way. . . . Here, as in many other cases, the secret of understanding a subject which is abstract is a more clear realization of the fact that we ought not to have thought that we understood the part which we regarded as non-abstract. . . .

" . . . Apart from its relativistic bearing, the most revolutionary part of Einstein's gravitational theory is its substitution of, in place of force acting in opposition to kinetic reaction as a starting-point in any thinking, the properties of a mathematical curve as a more fit thing in which to find a representation of nature's laws. It is not a question of one method being right and the other being wrong, but a clear realization that neither has any claim to ultimate fundamentality other than that which its simplicity implies."

[1] Swan, W. F. G., " The Trend of Thought in Physics," *Science*, Vol. LXI (1925), p. 426 ff.

The following parable from the article by Swan illustrates the point :

" Suppose a crater with a house in the centre, and a traveller setting out to get from one side of the crater to the other by the shortest path. . . . By taking a course crossing the crater part of the way down, he will find a path shorter than any other, and this is the path he will take. Suppose, now, that while this is true, we know nothing about it, and that we find ourselves seated high up in an aeroplane watching the spectacle. Of course, I shall not see the crater as such ; everything will appear flat. I shall see the traveller, and wonder why he does not go straight across the crater, and through the house. If I had been taught in my youth that a body moves in a straight line unless a force acts on it, I shall conclude that the house repels him. . . . Then, I shall ponder how the house repels him. Possibly I shall receive a sudden inspiration which will lead me to believe that the house contains a man who is provided with a hose, which he plays on the traveller compelling him to keep away from his property. I may be able to describe the traveller's path very accurately in terms of the hose. . . . Now suppose you should bring me some observations which show the motion of the traveller was not exactly what we thought it was. The difference might be very slight but it might be of such a nature as to upset completely the simplicity of the action which I had imagined as going on by virtue of the hose. Of course, I shall at first cling to the hose but shall modify it slightly. I shall say, ' Naturally this is no ordinary kind of hose. Possibly it does not push entirely in the direction in which the stream of liquid travels,' but I shall have to face the situation that while the discrepancies may be small in amount they may be large in principle and involve such radical changes in my notions of the mechanism of the process that the hose which I shall have to picture will be radically different from any hose which I have ever seen.

" . . . I shall soon be in the position of expending 99 per cent. of my ingenuity in trying to understand the hose, leaving only one per cent. for the law of the traveller. Now, supposing that while I am doing this, and am feeling rather disheartened with my success, you should come to me and say : ' I have made a discovery. I do not know why the traveller moves as he does ; neither, I think, do you, but I have found exactly how he does move. He is moving across a crater by a path which is the shortest distance between two points, not as the crow flies, but across the crater, whose form I can describe to you in a very elegant way, and which appears to play a very important part in

a lot of other phenomena going on down there, the direction which that little stream takes for example.' Suppose you should say this, and should add, ' Now I am going to take this statement of the law as my starting point. If there is to be any hose in the matter, it is the hose which is going to be explained in terms of the fundamental law, and not the fundamental law in terms of the hose.' I think I should have to admit that your attitude was at least reasonable. It is a change of viewpoint of this kind to which we have to adapt ourselves in passing over from the Newtonian description of motion to that adopted in Einstein's theory of gravitation."

VII. *The Discovery of Values.*—New concepts of value originate as other concepts do in symbolic reactions which designate and so define hitherto implicit phases of experience. But the apperception of values is a peculiarly important and delicate feature of thought. Value is a general term for formulated intent or interest. It includes any items or patterns recognized as actually or merely potentially present within the total functional patterns of intention or interest. Here the dominant and recurring motives of physiological adaptation and emotional organization are included together with the subtle play of suggestions in creative imagination. Fleeting intuitions of motive and interest play in the emergence of formulated values, along with perceptual imaginations and the play of curiosity. Intention is a gradient within organic experience.[1]

The peculiar importance of thought about interests arises because of the fact that they are, by definition, dominant in conduct. And the peculiar delicacy of such thought lies in the fact that values have their only tangibility in the symbols that define them, and are closely bound up with unconscious and implicit factors. Values are not " there " like public things to be readily pointed to and found again.

There are, to be sure, so-called " institutional values ", such as prices, moral principles, political rights, privi-

[1] See Chapter I and Chapter VI above.

leges, and interests. Such *institutional values have a two-way partial relationship with organic interests.* Institutional interests are in part controlled by the operation of personal motives—but in large part they are controlled by institutional changes and the operation of physical factors which are more or less independent of personal motives. On the other hand, institutional values are social instruments which operate within the lives of individuals and condition the growth of personal motives. At the same time, personal motives are in part determined by hereditary organic constitution and various factors of early conditioning which are relatively independent of standardized social values. Thus personal " values " and institutional " values " are different but inextricably interrelated—each set enters as a partial determinant into the formation of the other set. The operation and satisfaction of these two types of value is the basis of the distinction made by some economists between " psychic income " and " real income ". This distinction is also fundamental to the satisfactory definition of " interest " in legal theory.

The importance of the *adequate statement of intentions* is not merely that this enables us to communicate interests and effect social adjustments. Such statement also enables us to clarify organic preferences and create *new value syntheses* which preserve the most vital features of crude interests (unconscious or formulated inadequately) and at the same time eliminate many of the *interferences* which are hidden within these cruder motives, and which unless so eliminated spell personal conflict, confusion, and frequently even insanity.

This recreation of personal values in meditation, conference and artistic experience undercuts the opposition between self-interests and interests in others which obsessed the old dogmatic ethical theorists. In the reconstitution of personal values, motives with various personal and social references are involved in an intricate reconciliation of total interests which is far deeper than the mere adjust-

ment of fixed sets of selfish versus fixed sets of social motives.

The significance of play, music and drama beyond their own immediate joy, is this purification of intent in the plasticity of æsthetic experience and intricate imagination. Music itself, of course, involves a special sort of symbolism. But its symbolism cannot be directly translated in terms of other symbols. The very ineffability of fugues and sonatas like the view of some vast scene stirs new surges and syntheses of organic preference. Such experiences afford adventure in new worlds. Most of the fantasies that rise and dissolve in music are elusive, leaving undefined eagerness for life behind them, but in them old concepts take on new meanings. The children of the household catch hands with the children of the wind.

The art of the poet is not the ineffable art of the musician. He, too, is an explorer of unsymbolized experience, but it is his peculiar task to be a " maker " of symbols of value. Poets sail uncharted seas, but they speak a familiar tongue. The reflective consideration of concepts of value is a phase of another art, the art of wisdom. The two arts merge indistinguishably, for the extent to which meanings are explicit is a matter of degree. No thought except the barest manipulation of mathematical or logical symbols is wholly abstract and explicit ; and æsthetic imagination rarely runs very far free from some sort of communicable symbols. The most immediate apprehension of " free values " appear in the imaginations of little children and in the poetry of such writers as Keats, Morris, the Rossettis, and modern imagists like H. D. The art of philosophical poets like Blake, Wordsworth and Shelley, and the art of dramatists and novelists is more frequently characterized by reflection upon traditional values, and is typically intermediate between free fancy and philosophical meditations.

There seem to be two quite different moods in value experience, the mood of the child at play, eager for this

and that, and the mood of the child in doubt, seeking to understand things. The first is the mood of "healthy-mindedness", the mood of adventure and laughter. It is the mood of Ulysses and Robin Hood, Peter Pan and Walt Whitman. It is the mood of Rupert Brooke in "The Great Lover":

> These I have loved:
> White plates and cups, clean-gleaming,
> Ringed with blue lines; and feathery, færy-dust;
> Wet roofs, beneath the lamp-light; the strong crust
> Of friendly bread; and many-tasting food;
> Rainbows; and the blue bitter smoke of wood.

The second mood of value experience is that of doubt and the quest of peace. This is the mood of philosophy. It is also the mood of mysticism. But the self-conscious mystic has usually striven to rid his mind of symbols, in order that he might receive some wholly new revelation of truth. An appreciation of the nature of symbolic activity and the gradual process in which knowledge matures reveals the futility of such expectation of sudden inserts of systems of truth. At the same time, it makes possible an appreciation of meditation as a quest for fresh apperceptions of experience and new syntheses of organic preference. In the calm and relaxed mood of meditation there arise new ideals of greater beauty and greater unification of life:

> But often, in the world's most crowded streets,
> But often, in the din of strife,
> There rises an unspeakable desire
> After the knowledge of our buried life,
> A thirst to spend our fire and restless force
> In tracking out our true, original course;
> A longing to inquire
> Into the mystery of this heart that beats
> So wild, so deep in us, to know
> Whence our thoughts come and where they go.
> . . . Only—but this is rare—
> When a beloved hand is laid in ours,
> When, jaded with the rush and glare
> Of the interminable hours,

Our eyes can in another's eyes read clear,
When our world-deafen'd ear
Is by the tones of a loved voice caress'd—
A bolt is shot back somewhere in our breast,
And a lost pulse of feeling stirs again :
The eye sinks inward, and the heart lies plain,
And what we mean, we say, and what we would, we know.
A man becomes aware of his life's flow,
And hears its winding murmur, and he sees
The meadows where it glides, the sun, the breeze.

And there arrives a lull in the hot race
Wherein he doth for ever chase
That flying and elusive shadow, Rest.
An air of coolness plays upon his face
And an unwonted calm pervades his breast.
And then he thinks he knows
The Hills where his life rose,
And the Sea where it goes.[1]

VIII. *The Reconstitution of Institutional Values.*—The modes of interaction between institutional values and personal values, defined in the previous section, give a key to the effective arbitration and control of social processes. The genuine arbitration of social conflict depends upon the statement of the interests and conditions involved, in an atmosphere of tolerance and truth, and the co-operative investigation of the possibilities of new procedures which are most consistent with those interests which are most intense, most permanent, and most widely shared.[2]

The diplomatic procedure of "seeking a formula" which will satisfy the various national interests involved

[1] Arnold, "The Buried Life."

[2] This does not involve the false assumption either that the most intense interests of some are the most widely shared, or that the most permanent interests of all persons are identical. The adjustment between various interests held very strongly by a minority and conflicting interests held more feebly by a large majority must always proceed empirically in the concrete situations. There are some personal interests which are so intense as to be recognized as inviolate, at least, except in the most extreme cases of public demand—such as liberty of life and "conscience".

in any dispute is the only possible *modus operandi* of genuine diplomacy, in contrast to mere militant domination, treaties and intrigues. The procedure, however, may be shallow and inadequate or genuine and effective according to the degree to which the following conditions are preserved:

(1) Adequate representation of all groups who have serious interests at stake in the issues considered; (2) systematic, scientific and co-operative determination of "facts", such as the underlying conditions and remote effects of various processes actually in operation and various changes suggested as possible; and (3) the availability of a body of precedent and accepted canons of systematic procedure in interpretation and adjustment (such as characterize the procedure of an established tribunal in contrast with the procedure of irregular assemblies and conferences).

These same principles, illustrated above in relation to diplomatic procedure, apply to the whole range of social adjustment including civil government, family disputes, such as adjustments of interests between parents and children, and industrial disputes. Probably the most serious factor which vitiates conferences in all three of these realms is neglect of the first and essential condition: the full, free and adequate representation of all the interests involved in a frank and tolerant atmosphere. This is largely a matter of organization and social tradition.

It is, however, in relation to the second and third conditions described above that scientists and ethical theorists can make the greatest contributions to the solution of social conflicts. And in these vital concerns of the determination of facts of social interest and canons of social interpretation (as in the realms of economics, government, family, race relations, morals and religion) the traditional divorce between science and philosophy has had and is having its most vicious effects. The so-called social scientists, to the extent to which they have been inadequately equipped in cognate fields, such as physiology,

psychology, and logic, and in philosophical theory, have alternated between isolated collections of misunderstood data, usually irrelevant to the problems to which they are applied, and headlong excursions into the realm of " pure theory ". Meanwhile, the so-called philosophers, in so far as they have been insensitive to the processes of empirical science, have attempted to formulate moral principles and principles of government without reference to statistical research or controlled experimentation with the physical, social and organic conditions which control the validity of any moral principle or any theory of government. For example, the attempt to define principles of sex conduct without relation to the empirical data of current sex practices and their physiological and social conditions, or the attempt to define property rights without reference to the distribution of income and the organization of industry is as scholastic and barren a procedure as the ancient discipline of formal logic.

The whole mass of ethical theory must be fundamentally reorganized in relation to the empirical treatment of the growth of human reason, on the one hand, and the empirical treatment of the particular social and personal processes in need of symbolic adjustment, on the other hand. New and adequate treatments of ethical problems will bristle with facts, and proceed with constant reliance upon tested data and established scientific principles. Such reconstitution of the canons of interpretation is being rapidly effected in some fields, notably, institutional treatment of economics, the sociology of law, and the study of parent-child relations.

IX. *The Love of Wisdom.*—The last words of thought are not the words of the scientist in the establishment of new knowledge, nor the words of the poet in immediate apprehensions of imagination and beauty and new ideals. The last words of thought are the words of friends by the fire, and labourers at their tasks, and members of committees in boys' and girls' clubs, and executives in their

offices. The judgments which issue in the control of conduct are necessarily, in large part, concrete judgments. They must take implicit meanings into account, judge personality, and weigh uncertain patterns of consequences. Such judgments are inevitably affected by unconscious organic preferences, unrecognized value factors. The judgments of life cannot be executed merely in a series of formal implications. This is inevitable. But sound judgments, as contrasted with snap judgments, prejudices, and short-sighted confusion, depend upon *the extent* to which the situation *is* reflectively organized in definite symbols and schemata and guided by systematic elaboration of possibilities and the extent to which various factors, including our own motives, are explicitly taken into account and their various implications explicitly stated. The capacity to give such reflective treatment to any concrete situation will depend upon the extent to which we have developed the *habit* of systematic reflection rather than precipitate and rash judgment and the *store* of organized knowledge, clear concepts of value, consistently developed implications, and logically organized theories, which are on hand and available as the result of previous reflection. This store of fact and theory integrated with the wide range of human interests, and this habit of reflective thought, are *wisdom.*

Wisdom differs from mere knowledge because it includes theory and art. It is an affair of confidence which, although its effectiveness is dependent upon truth, is more competent than truth. The continual conversion of theory into knowledge and fragments of knowledge into systematic truth is the path of science; such truth has a validity which the first naïve pragmatic truths could not boast. And, in turn, the advance of truth makes possible growth of new and more significant theory. Facts are the reinforcements of science, but theories are its advancing columns. Moreover, in the most important social problems, procedure must be carried on where the best guides of thought cannot be validated in exact Yes

or No, exact truth or falsehood, but must be determined judgments of varying degrees of confidence. Deliberate discussion and reflection upon probable theories and their mutual implications, the best organizations of interests, explicit hypotheses of conduct, and systematic conceptions of the nature of things is the procedure of lovers of wisdom. Although wisdom must take account of larger realms of implicit meaning, probabilities, and indefinite motives, it employs truth as its handmaiden, constantly refers to facts, and utilizes exact experiment and systematic inference to the limit in every problem. Truth and wisdom are not rivals but partners, and knowledge is the strength of wisdom. Philosophy is not the craft of a special guild. It cannot be vicariously carried out by experts. Professional philosophers may contribute to the growth of wisdom by the unusually persistent elaboration of certain conceptions and the discovery of new and significant ideas. But the phases of thought in which professional philosophers have frequently most prided themselves, the neat and architectonic character of their metaphysical systems, in twelves, and fours, and threes, and twos, and ones, have usually had the least worth. For wisdom does not grow that way. Their contributions have had greatest significance when they have been suggestive and imaginative and intimately related to the progress of scientific research and to concrete social problems and movements.

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